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Contents

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Issue Before the Nation

THE issue before the nation in the present General Election is of the gravest kind. A false step taken at this crisis would wreck British credit throughout the world and cause untold damage at home. What is wanted is a clear verdict, placing the control of national affairs in safe and sane hands for the next few years, and demonstrating that national safety comes before all sectional interests. Such a verdict would do more than anything else could to restore world confidence in British stability. Every vote cast in favour of it will be the individual citizen's best contribution to the welfare of the country and the surest first step towards a return of prosperity for all classes.

The issues submitted for decision at this election are predominantly economic and touch the manufacturer and trader more closely than the more strictly political and constitutional questions on which a national vote was demanded in the recent past. The keener business heads saw the storm coming months before the political leaders were awakened by its actual appearance, and it was because of this foresight that the private finance of the country is not in such a critical condition as its public finance. Not only is British industry solvent, but its inherent soundness has been proved afresh by its acceptance without protest of an increase of direct taxation in a period of acute trade depression. Nothing, indeed, has been more remarkable in the astonishing events of the last two months than the absence of any organised opposition to the raising of the income-tax to a level that had never been approached in this country before except under the stress of war. The producing classes did not kick against it, first because they could not shirk their individual contribution to a national appeal for all-round sacrifice to secure a balanced Budget, and secondly because they saw, however dimly, the prospect of an economic reconstruction that would lead in the long run to increased trade and decreased taxation.

The clear-headed business man, in analysing the questions that are most furiously being discussed during the election campaign, sees ahead a danger of which he is already warning his political friends. There is a well-grounded distinction in the British financial system between direct and indirect taxation. At one time the two forms of taxation produced approximately equal yields. The tendency, however, during the last twenty years has been for the direct taxpayer to bear a far heavier burden than the indirect taxpayer, until the balance has been completely upset. The danger ahead is that the minimum load now borne by the indirect taxpayer will be largely increased without any corresponding diminution of the direct taxpayer's load. It is taken for granted that one outcome of the election will be the imposition of tariffs on foreign imports in some form or another. The leading men of all parties agree that drastic measures must be taken to restore the trade balance, which has become adverse for the first time in modern history. It would, however, be absurd to disguise the fact that tariffs, as distinguished from the threat of them, fall into the category of indirect taxation. The effect of tariffs in different industries may well vary, but broadly speaking the collection of a Customs duty is of the same nature as the levying of an indirect tax. The need may well have been established by argument, but the result ought not to be in doubt.

It seems likely, then, that the yield from indirect taxation will be greatly increased in the next few years. As every Chancellor of the Exchequer notoriously finds it much easier to put on taxes than to take them off, there is a palpable risk of the nation's having to carry the maximum load of both forms of taxation. That would be absolutely fatal to any permanent revival of trade. Where the business man can make his influence felt on the politician after the election is to hold tightly to the principle that any increase in indirect taxation must be accompanied by a corresponding decrease in direct taxation. Whatever our individual prejudices, it is vital that the taxation issue should be faced and that the Government should be warned in time that the manufacturing and trading classes will present the most resolute opposition to any attempt to make the best of both worlds to the clear detriment of the financial structure of Great Britain.

Making Tungsten Reflect

IT is a hundred and fifty years since Scheele first obtained the yellow powder tungstic acid. To-day tungsten is the most important outside the so-called commercial metals, the world output of it being nearly one-third that of nickel. For the past quarter of a century the problem has been to deposit metallic tungsten electrolytically, but for various reasons this has not proved easy in practice. Recently Professor C. G. Fink, of Columbia University, has attained success by passing an electric current through an alkaline aqueous solution of sodium tungstate and depositing tungsten on a variety of metals. Since tungsten is brighter, has a higher melting point and is more resistant to corrosion (in particular to the action of hydrochloric acid) than the usual plating metals, the practical possibilities of the new achievement are obvious. The alchemists called antimony " the wolf " because it devoured the baser metals used in the refining of gold, and the mineral wolfram apparently got its name because it caused loss of tin in smelting. What have we done with Tungsten? As a constituent of high speed tool steels with a hardness second only to the diamond it has enabled one man with a lathe to do as much as five men with five machines did formerly with carbon steel. The tungsten filament, a result of the team work of the famous laboratory at Schenectady, was computed 20 years ago to have effected an annual saving of £50,000,000 in current charges. We know what tungsten means to the radio industry; who can tell what further benefits its application has in store for us? It will reflect brightly now it is electro-deposited—reflect the imaginations of those who have wrought so much with it.

Dr. Armstrong on Hydrogenation

FROM time to time the march of applied science in industry brings with it new words, which gradually become understood by the public. One of the latest of these is " Hydrogenation," which forms the subject of a public lecture that Dr. E. F. Armstrong is giving before the Institution of Chemical Engineers on Friday, October 30. The lecture will be delivered at the Institution of Civil Engineers, Great George Street, London. The term hydrogenation is used to describe the process whereby hydrogen gas is made to combine with substances, converting them into something else that is more useful. Its first application was to turn soft whale oil into a product equivalent to hard tallow. The latest achievement of hydrogenation has been to convert coal into oil.

No one is more competent than Dr. Armstrong to discuss all that hydrogenation involves. He has been active in this field from the early date of its application to industry, while on the scientific side he has been a pioneer in giving an explanation of all the mysteries that lie behind the subject. The hydrogenation is effected by means of catalysts, and much of what we know about catalysts and the laws that govern their behaviour is based on discoveries made in connection with the study of hydrogenation.

We understand that Dr. Armstrong intends first to give an account of some of the many practical applications of hydrogenation, then to summarise the latest views in regard to the theory of the subject, and finally to turn his attention to the manufacture of hydrogen gas. As it is the hydrogen gas that is usually the most costly part of the process, it is obvious that to the chemical engineer this part of his address will be of particular interest.

Books Received

CHEMICAL ENGINEERING GROUP PROCEEDINGS. Vols. 11 and 12. 1929 and 1930. London: Society of Chemical Industry. Pp. 154. 10s. 6d.

FLOTATION. By Erwin W. Mayer and Hubert Schranz. Leipzig: S. Hirzel. Pp. 593. RM. 35.

THE PREPARATION, SELECTION AND DISTRIBUTION OF COAL. By The Coal Trade Luncheon Club and the Institute of Fuel. London: Industrial Newspapers, Ltd., Pp. 182.

THE PROBLEMS OF SPECIFICITY IN BIOCHEMICAL CATALYSIS (33rd Robert Boyle Lecture). By Sir F. Gowland Hopkins. London: Oxford University Press. Pp. 20. 1s. net.

THE USE OF FERTILISERS. By A. Jacob and V. Coyle. London: Ernest Benn, Ltd. Pp. 272. 10s. 6d.

TRANSACTIONS OF THE INSTITUTION OF CHEMICAL ENGINEERS. Vol. 8, 1930. London: The Institution of Chemical Engineers. Pp. 232.

The Calendar

October	26	Society of Chemical Industry and Institute of Chemistry (Edinburgh Sections): " Housing the Industrial Chemist." W. R. Guy. 7.30 p.m.	North British Station Hotel, Edinburgh.
	28	Institution of Chemical Engineers: Graduates' and Students' Section: " Crushing and Grinding with special reference to Ball Mills." C. A. R. Stead.	London.
	29	British Association of Chemists: " Vat Dyestuffs—Their Application and Properties." F. Scholefield. 7 p.m.	Technical College, Derby.
	31	Institution of Chemical Engineers: " Hydrogenation." Dr. E. F. Armstrong. 6.30 p.m.	Lecture Theatre of Institution of Civil Engineers, Lon.
	30	Institute of Metals (Birmingham Section): Dinner and Dance.	Queen's Hotel, Birmingham
	30	Institute of Chemistry (Belfast Section): " Recent Advances in Animal Nutrition." R. G. Baskett. 7.45 p.m.	Royal Belfast Academical Institution.
November	2	Society of Chemical Industry (London Section): " The Saccharification of Wood." Dr. H. A. Auden and Dr. W. P. Joshua. 8 p.m.	Burlington House, London.
	2	Hull Chemical and Engineering Society and Society of Chemical Industry (Yorkshire Section): " Emulsions." A. H. Dodd, J. Pryce Jones, A. N. Mosses. 6.45 p.m.	Station Hotel, York.
	4	Society of Public Analysts. 8 p.m.	Burlington House, London.
	5	Diesel Engine Users' Association: "The Elimination of Vibration." R. B. Grey.	Caxton Hall, London.
	5	Chemical Society. 8 p.m.	Burlington House, London.
	5	Society of Chemical Industry (Bristol Section: " The Relation between Corrosion and Paint." Dr. L. A. Jordan and Dr. W. H. J. Vernon. 7.30 p.m.	University, Bristol.
	6	Oil and Colour Chemists' Association (Manchester Section): " Modern Development of Inorganic Pigments." Noel Heaton.	Liverpool.
	6	Society of Chemical Industry (South Wales Section): " Chemistry in the Service of the Doctor." Dr. Sladden. 7.30 p.m.	Thomas' Cafe, High Street, Swansea.

Asphalt Paving Materials

Notes on Manufacturing and Testing

The following extracts are from a paper on the Manufacturing and Testing of Asphalt Paving Materials, presented by Donald M. Wilson, B.Sc., A.I.C., at a meeting of the Chemical Engineering Group of the Society of Chemical Industry, October 9.

ASPHALT paving materials consist of two main ingredients, the mineral aggregate, which may be sand, limestone, granite, gravel, broken flints, clinker, slag, or mixtures of two or more of these materials, and the cementing medium consisting of asphatic bitumen which binds the grains of the mineral aggregate together. A remarkable range of products results from variations in the relative proportions of the different ingredients. Differences in the fineness of the mineral aggregate, the hardness of the bitumen, and the relative proportion of the bitumen to aggregate result in mixtures which can be handled and laid in different ways to meet all conditions of traffic, foundation and climate. Accordingly, asphalt paving materials can be divided into the following classes:—

(*a*) *Compressed asphalt,* which is spread on the road in the heated condition and consolidated by hand rammers and ironed.

(*b*) *Asphalt slabs,* consisting of the same material compressed by hydraulic presses and delivered to the road ready to be laid on the foundation.

(*c*) *Mastic asphalt,* which is spread on the foundation in the hot viscous state by means of wooden floats.

(*d*) *Steam-rolled asphalt,* laid on the foundations whilst hot, raked to the correct contour, and consolidated by a steam roller.

Manufacturing Procedure

The raw material, rock asphalt, is an intimate mixture of limestone, of special structure, and bitumen. The rock is found in many parts of the world, the best deposits being in France, Switzerland and Italy. To prepare the rock for use it is crushed and ground in squirrel cage disintegrators to a fine powder, which is then gently heated in rotating drums to remove all traces of moisture, and the temperature is afterwards gradually raised to 140° C. The hot roasted powder is then loaded into wagons, covered with sacking to conserve the heat during transit, and carried to the road, when it is spread to an even thickness, usually just over 2 in., and consolidated by ramming with hand rammers, the surface being finally sealed by ironing with hot irons.

Mastic asphalt consists of a finely-divided aggregate, which may be rock asphalt or limestone, or mixtures of these materials, mixed with a comparatively hard bitumen, the bitumen being in slight excess of the amount required to fill the voids so as to enable the mastic to flow whilst hot. The rock asphalt should have approximately the same grading as that of the powder prepared for compressed work. The mastic is manufactured at a central depot in 6 to 8-ton mixers fitted with furnaces. The bitumen is melted, the mixing arms rotated, and the aggregate is added gradually, the finest material first. Heating is arranged so that the temperature keeps about 180°C. Directly the fine powder is properly mixed with the bitumen, the coarser particles are added from time to time, until the whole of the aggregate has been introduced. Heating and mixing continue for 5 hrs., the temperature being increased gradually to about 220°C., and when incorporation is complete, the mastic is drawn off through treacle valves and run into moulds and allowed to cool. When required for use, these blocks are remelted in similar cookers, with a small proportion of bitumen, and 30 per cent. to 45 per cent. of granite chippings are added. When the chippings are thoroughly incorporated, the resulting granited mastic is drawn off and spread by hand by means of wooden floats on the prepared foundation at a thickness of $\frac{3}{4}$ in. to 2 in. acccrding to the requirements.

Nearly all the asphalt pavements laid during the last few years, which have to carry fast running traffic, have been provided with a roughened surface, and if this is properly done these surfaces will remain rough for long periods of time. Necessarily the coated chippings must be carefully chosen and possess a high resistance to crushing: they must be adequately coated, and must be applied to the surface whilst it is neither too hot or too cold. The paving material itself into which the chippings are secured must not be too plastic or the chippings will be forced into the surface too far, nor, on the other hand, must it be too hard or the chippings will not be held in place securely.

Tests on Raw Materials

The success of an asphalt mixture depends largely upon the properties of the bitumen employed and samples of the material it is proposed to use must be examined with care. Bitumen is usually tested for penetration, ductility, melting point (ball and ring), loss on heating, viscosity. Loss on heating should be tested at 200°C., and after heating the bitumen should be tested again for penetration and ductility. The temperature suggested is higher than that usually employed, but it is desirable to know how the bitumen will behave at the temperature at which it will meet the hot aggregate in the mixer. A bitumen which suffers severely under this test will suffer severely during the manufacturing process, for considerable hardening may take place during the mixing period owing to the large surface of the mineral aggregate over which the bitumen is spread; hardening may result partly from consequent loss of the more volatile constituents and partly by oxidation. The Viscosity test should also be made preferably at 200°C. An Engler viscometer, adapted for electric heating, is the most satisfactory instrument for this purpose.

The grain sizes of the mineral aggregate have an important influence on the behaviour of a mixture. The relative proportions of the different grain sizes of the mineral aggregate can be obtained by sieving, but, unfortunately, there are a number of different systems of sieves in use. The grading of an aggregate can, however, be expressed graphically by plotting the cumulative percentage by weight of material coarser than each mesh size, against log mesh opening. The curves are exactly the same shape whatever system of sieves is employed, and it is possible to plot a curve from readings obtained on I.M.M. sieves and read off approximately the grading which would be given by any other series of sieves, knowing the diameter of the mesh openings in each case. The finer sieves in any of the well-known series, although they may show, on an average, a correct "count" in each direction, have been found to possess a number of holes bigger than the diameter proper to that mesh. Many 200-mesh sieves are so inaccurate that they may have an appreciable number of holes which will pass 100-mesh grains. As the percentage of fine material in an asphalt mixture is important, it is better to get an idea of the amount of fine material present in an aggregate by means of a "flourometer," in which 5 grams of the aggregate are tipped into an ascending current of air, and the "flour" is blown out of the instrument whilst the coarse material falls to an angle tube at the base of the instrument, from which it can be removed and weighed, the loss in weight representing the amount of flour in the sample.

Tests on Manufactured Materials

To check the product from the plants, frequent analyses of bitumen content are necessary, for a shortage or an excess of bitumen will lead to failures. The penetration of the bitumen as it exists in the road surface should also be known, and the following method provides a means by which it is possible to recover the bitumen from an asphalt mixture in its original state, and thus determine the penetration of the bitumen as it actually existed in the mixture. Materials may be manufactured with, say, 45 penetration bitumen, but if temperatures are too high or the bitumen is too sensitive to heat it will harden to such an extent that the possible life of the paving may be seriously reduced. The method consists in dissolving the bitumen out of the asphalt mixture with carbon disulphide, filtering the liquid, and then removing the solvent in a number of successive stages. Removal of the solvent may not be absolutely complete, and it is quite

possible that some of the lighter oils of the bitumen are replaced by carbon disulphide.

For the extraction of the bitumen with CS_2 sufficient dry bituminous material is dissolved in carbon disulphide to provide exactly 100 grams of bitumen, and the solution is filtered. The residue on the filter paper is washed clean, and the weight of the mineral aggregate checked to ensure that the proper amount of bitumen has been extracted. The filtrate is then reduced in bulk to about 150 c.c. by distillation in a 1000 c.c. conical flask fitted with a delivery tube, condenser, and a small tap funnel, through which regular additions are made, care being taken to avoid too rapid an evolution of CS_2. The solution is then transferred to a 300 c.c. CO_2 flask, and further removal of CS_2 is effected on the water bath. At the expiration of 4 hrs. the flasks are removed and are ready for "boiling water bath treatment" when the flasks are immersed, generally four at a time, up to their necks in boiling water for 5 hrs. Each flask is provided with a stirring rod and the bitumen is stirred every 10 min., whilst the water is kept boiling vigorously and the water level maintained constant. At this stage frothing sometimes will occur immediately the flasks are placed in the water bath, but it can be made to subside by careful stirring.

The final oil bath treatment is carried out in a bath, fitted with stirring gear and thermostat, heated electrically to 105° C., and four flasks are placed in a special rotating holder so that they are immersed to their necks. The level of the oil should be high enough to bring the tops of the flasks just above the outside rim of the bath. The temperature is kept at 105°C. for exactly 1hr. 5 min., the samples being stirred at intervals of precisely 10 min. Heating is then gradually increased during a subsequent period of 55 min. until the temperature reaches 130°C., at which it is kept constant, by the thermostat, for an interval ranging from 4 hrs. 15 min. to 5 hrs. 45 min. according to the type of bitumen that is being recovered. The times of heating in the oil bath can be worked out once and for all by dissolving bitumens of each type of known penetration, passing them through the different stages and determining the time required at 130°C. on the oil bath to bring the penetration back to its original figure.

Pat Stain Number

With steam-rolled mixture it is necessary to know if bitumen is present in slight excess of the amount required to fill the voids and coat the grain surfaces, and the well-known pat stain test is useful, even though the stain can only be described as "light," "medium" and "heavy." The sample is compressed between two wads of filter paper and any excess bitumen forced into the papers so that the number of papers stained by the bitumen gives a numerical measure of the "richness" of the sample. A wad of 40 discs 2 in. in diameter cut from No. 5 Whatman filter paper is placed in the bottom of a cylindrical hardened steel mould 2 in. internal diameter and 4 in. in height, which has been heated to a temperature of 200°C. Approximately 200 grammes of the asphalt material to be tested is also heated to 200°C., introduced into the mould, covered with another wad of papers, and the mould finally closed with a well-fitting plunger. The complete mould is placed in an hydraulic press and a load of 6,000 lb. per sq. in. applied for 30 sec. Free bitumen is squeezed out of the sample and the papers will be stained. After 30 sec. the pressure is released, the mould supported on wooden blocks and the plunger pushed right through, thus ejecting the base plate, wads of papers, and the material under examination. The papers of both wads are separated and examined and the average number showing a stain in the central portion, to the nearest whole number, is the "pat stain number."

Points from the Discussion

Dr. W. Cullen said he imagined that some of the bitumens —which presumably were the organic constituents of asphalts —must differ in respect of their power to resist the effects of atmospheric or solar influences. He pointed out that one of the best known tests on paints was to determine the effect of ultra-violet rays upon them. Some of the bitumens—particularly the residues from the Trinidad oils—were said to possess lasting properties superior to those of other bitumens, and he asked for further information in that connection. It was well known that oils varied tremendously, and the asphaltic base oils varied very much in respect of their bitumen contents.

Dr. Percy E. Spielmann described the paper as one of the most valuable communications on the subject that had appeared for a long time, because not only did it cover a large field of practice, about which it was highly informative, but it also described methods of examination (some new and some developments of known methods) which commanded confidence at once, because they had been used and tested for years before being published. With regard to compressed asphalt, he asked whether Mr. Wilson had ever followed the increase of compression it underwent with time, by measuring the specific gravity or voids near the upper and lower surfaces of the carpet and determining when, if ever, they became alike. This, he said, should have some relation with the life of the surfacing. Discussing asphaltic mastic, he asked if any study had been made of the rate of impregnation of the added material by the bitumen, and whether it was the time taken for the completion of this impregnation or the time required for the mixture to become uniform that determined the length of the period of heating. The most valuable information in the paper was the detailed description of the method of recovering bitumen for the re-examination of its properties. The problem had been tackled in Germany and in America, but, judging from the published matter, Mr. Wilson's method appeared to be the most accurate and the simplest of them all. The simple ingenuity of the pat stain test was also attractive, and should certainly be adopted widely.

Physical Differences of Commercial Bitumens

Replying to Dr. Cullen, Mr. Wilson said there were differences in the effect produced by ultra-violet light upon different bitumens, but he pointed out in the bitumens produced commercially to-day there was a very large factor of safety, and one need not worry very much about the question of age. Some surveyors did not want a road to last too long, because within 15 years or so, a road surface had been broken so many times in order to gain access to mains and cables that it was desirable to renew it; every bitumen on the market to-day would last fifteen years. Oils varied enormously, of course. The makers and users of asphalt materials preferred the bitumen from asphaltic bases, and looked very shyly upon mixed base oils because of their paraffin wax content. Paraffin base oils were not suitable at all. There were great physical differences between bitumens produced from different crudes, and the best test he knew as a means of sorting them out was the viscosity test. The asphalt material manufacturers watched the big oil companies very closely and did all they could to obtain advance information as to any possible change in crudes.

Replying to Dr. Spielmann's question as to the increase of compression in compressed asphalt with time, he said it was known, of course, that the specific gravity varied. A compressed asphalt road was never completely compressed throughout its thickness until a very late period of its life. The top layer was compressed by traffic, and the lower layer, containing a high percentage of voids, acted as a cushion and absorbed a great deal of the vibration, thus protecting the concrete underneath from damage. In the course of time the compression spread downwards, and when the asphalt was fully compressed throughout it started to wear. As to asphaltic mastic, he had not studied the rate of impregnation of the added material by the bitumen. Mixing was carried out as quickly as possible. It was necessary that the whole of the aggregate should be thoroughly coated and the temperature of the whole mass raised to about 220° C.; it was then considered fit to come out of the boiler.

Coal Tar Distillation in Canada

THE Dominion Bureau of Statistics at Ottawa reports that the output from coal tar distillation plants in Canada in 1930 reached a total of $3,334,066, or 13 per cent. under the corresponding figure for 1929. Ten tar distillation plants were in operation during 1930; capital employed by these concerns was reported at $5,042,373; employees numbered 2,211 and materials cost $2,518,329. The main products of this industry are creosote oils, tar, and pitch. These commodities are used extensively in preserving railway ties, telephone poles, building timber, etc., in highway construction, and in the manufacture of prepared roofing.

The Future Development of Coal

Smokeless Fuel and Oil from the National Standpoint

By Dr. W. R. Ormandy

(*Concluded from October 17, page 331.*)

A QUESTION of very great importance arises when regarding the possible replacement of household coal by smokeless fuel. Assuming in round figures that 100 tons of coal give 75 tons of smokeless fuel, will the public have to purchase 100 tons of smokeless fuel to obtain the same result as they would when burning coal? The answer is distinctly in the negative, but it is difficult to fix a ratio between the values, weight for weight, of average coal and average smokeless fuel. Experiments on this point have been carried out at the Fuel Research Division by the means roughly outlined above, but in an elaborated form, results being obtained in favour of smokeless fuel to the extent of 15 to 30 per cent. smaller fuel consumption. For the purpose of our discussion, we may assume that 20 per cent. less coke would be necessary to give the same heating effect as would be necessary if coal were employed. This means in effect that to displace the 40 million tons of household coal at present estimated to be used by 80 per cent. of its weight of smokeless fuel an additional 3 million tons of coal would be needed to produce the required coke. From this point of view, then, the campaign for smokeless fuel is not likely to lead to any considerable increase in coal production.

If smokeless fuel, as has been suggested, is to be produced at or near the source of the raw material, the problem of carriage also arises. To-day the average railway truck carrying coal moves slightly more than nine tons per truck per journey; but smokeless fuel occupies twice the space weight for weight, and the railway companies will be faced with another problem. The trade in household fuel is essentially seasonal. At present coal is mined faster or slower as the demand rises or falls; but if a smokeless fuel is to be provided in place of coal then the works manufacturing such smokeless fuel will either have to have a peak load capacity or work into stock during the summer months.. The storage of coal in large quantities is a serious enough problem, but the storage of a light coke occupying twice the space is even more serious. In the handling of coal into and out of storage, quite appreciable amounts of smalls are made, but it is to be feared that this percentage would be higher in the case of coke. Experiments have been cited to show the great and deleterious influence exerted by water in diminishing the value of cokes in general. Unfortunately cokes suitable for use as smokeless fuel are very absorbent and take up water much more readily than they give it out. Even in the ordinary course of transport from the smokeless fuel factory to the distributors, our English summers, not to mention winters, could do considerable damage, and if storage is to be employed for the equalisation of production to meet varying demands, covered storage would be essential.

Gas from Low Temperature Carbonisation

Just as in the case of the gasworks and the coke-ovens, the amount of gas produced varies with the temperature and the nature of the plant employed. Extenrally heated retorts at a low temperature give a minimum volume of gas of high calorific value. As the temperature increases, the amount of gas increases and the calorific value diminishes but the aggregate heat value of the gas produced increases. Where carbonisation is carried out by means of processes employing internal heating, still larger volumes of poorer gas are generated; but here again the aggregate of heat units contained in the gas is higher than in the case of the externally heated retorts. To displace the burning of raw coal for household purposes 43 million tons of coal will have to be carbonised to produce the requisite quantity of smokeless fuel. Assume that the gases from a ton of coal carbonised contain 32 therms, and that 15 therms are available over and above that required on the plant itself. The 43 million tons at 15 therms per ton give us an available surplus of 645 million therms. The gas industry carbonised about 18 million tons, with an average production of at least 75 therms making 1,350 million therms. In other words, at the very lowest estimate, the replacement of 40 million tons of household coal by 32 million tons of smokeless fuel would lead to an added production of combustible gas having a heat value equivalent to about one-half of that now produced by the gasworks.

Those who advocate low temperature distillation of coal on a large scale refer to the possibilities of getting rid of the gas by passing it into some hypothetical ring-main system. The report of the Area Gas Committee impresses the necessity for coke-oven gas, having an agreed-upon B.Th.U. content within the limit of plus or minus 4 per cent. After a careful examination they were only able to recommend the provision of a ring-main in one area of this country, and that on the assumption that coke-oven gas alone be taken into consideration. No ring-system could possibly exist, if supplied at a number of points with gas of varying thermal quality. It has elsewhere been pointed out that one-sixth of the towns' gas supplies consists of water-gas, which has to be enriched, and for the purpose of this enrichment 58.3 million gallons of imported gas-oil are used. If the production of low temperature coke were carried out at or near the gasworks, then the rich gas produced by low temperature distillation might be employed in place of the gas-oil for enrichment purposes.

Low Temperature Tar

Though the volume of gas produced by low temperature distillation is smaller than that evolved in high temperature distillation, the tar produced is greater in volume, and may be roughly taken as double. For the purpose of our discussion we will assume a somewhat high figure of 20 gallons of tar per ton. The character of the tar, like that of the gas and coke, varies with the temperature and conditions of its production, and if the process employed be really a low temperature one, working below 600° C., the tar will have the characteristics of a primary tar. It will contain little or no aromatics, be rich in phenolic content, and contain possibly twice as much spirit distilling below 180° C. as a high temperature tar. There may be about four gallons of motor-spirit fraction obtainable from the tar and by stripping the gas, but this spirit will be less valuable than the high temperature spirit, in that the absence of aromatics reduces the anti-knock capacity and consequently the value. Low temperature spirit also contains considerable quantities of unsaturated bodies and is, in consequence, comparatively expensive to purify, since more chemicals are required for the purpose and the percentage loss is higher.

The enhanced production of tar renders the question of the value of the tar more important than is the case with the gas industry. It has already been pointed out in connection with gasworks and coke-oven tar that the market for phenolic and cresylic distillates suitable for use in wood impregnation is already more than fully satisfied. Valuable research upon the characteristics of this new product is being carried out, and in the course of time doubtless new and valuable products will be isolated therefrom. It can hardly be expected, however, that this development will have any very serious influence on the immediate large-scale development of low temperature distillation.

Markets for Low Temperature Tar

Whilst we are waiting for the scientists to find out new products for which primary tars can serve as a basis, what markets are available? The first and most obvious is fuel oil. To make an acceptable fuel, the crude tar would have to be topped and distilled. These oils, with a mean calorific value per unit volume of 16,810, would be competitive with mineral oils averaging 19,000 B.Th.U.'s per lb. gross. Clearly weight for weight low temperature tar oils are worth less than imported fuel oils. Looking at the matter from the point of view of its use in oil-fired ships, the calorific value per unit of volume has to receive consideration, and even here, as the table shows, there is a slight balance in favour of mineral oils. The weight of oil to be carried, for equal results, however, would be in favour of the mineral oils, owing to the higher gravity of the tar oils. Regarded as a

Diesel engine fuel, it has also been pointed out that oils rich in cresylic bodies are distinctly at a disadvantage..

The only other outlet which has been suggested for topped low temperature tar is hydrogenation for conversion into motor spirit. It has elsewhere been stated that one of the main expenses in the conversion of coal into oil by hydrogenation is the cost of the hydrogen. The hydrogen content of low temperature tar oils is very much higher than that of coal, and it has been found in practice that little over one-half of the hydrogen is necessary for the conversion. Generally speaking, it can be said that low temperature tar oils are easier to hydrogenate than high temperature tar oils, that is, that the rate at which the raw material can be hydrogenised is greater in the one case than in the other. The fact that low temperature tars are comparatively free from so-called "free carbon" and low in asphaltic bodies simplifies their conversion by hydrogenation. The end products obtainable by hydrogenation of either low temperature or high temperature tar oils are very similar. A light creosote oil has been found on hydrogenation to give a yield of about 100 volumes of product per 100 volumes of raw material, but the gravity of the finished product was only 80 per cent. of that of the original raw material employed. The resulting spirit contained unsaturateds (1.6%), aromatics (57.0%), naphthenes (24.5%), paraffins by difference (16.9%), with an end boiling point of 180° C. A motor spirit having such a constitution would be far superior in anti-knock character to the imported motor spirit generally available.

Points from the Discussion

Professor C. H. Lander (representing the Fuel Research Board) confined his remarks to the problem of the production of oil from coal, emphasised its importance from the national point of view, and indicated some of the advances that had been made in regard to it. He suggested that Dr. Ormandy, judging by his references to Press statements as to the prices at which oil could be produced from coal by the process of hydrogenation, was rather more pessimistic than usual in regard to this matter. Experiments at the Fuel Research Station at East Greenwich were put in hand in 1920, in connection with the hydrogenation of coal for the production of fuel oils. It appeared to be a very difficult problem; one eminent scientist said quite specifically at that time that the thing was absolutely impossible, and that, as usual, the Fuel Research Board was wasting its time and energy in pursuing such a subject. In about the year 1925, however, a syndicate was formed in this country in order to investigate the claims for hydrogenation so far as its applicability to British coal was concerned, and, incidentally, that syndicate was organised by Dr. Ormandy. After a time, Dr. Ormandy had approached the Department of Scientific and Industrial Research for help, stating that the syndicate had exhausted all the money it had been able to raise for the purposes of its investigation, and that it had certain options with regard to patent rights in the United Kingdom and Portugal. As a result, two representatives of the Government had visited Germany accompanied by Dr. Ormandy, and saw there for the first time the process of hydrogenation of coal, and the result was that the syndicate was subsidised to a possible maximum of £25,000 by the Department of Scientific and Industrial Research.

The work carried out in Germany on behalf of Britain was placed under the control of a small committee, of which Dr. Ormandy was a member. There were also on that committee two representatives of the Government, another representative of the British Bergius Syndicate, and Dr. Bergius himself. For two years this committee had absolutely controlled the work that was being done in Germany, and within about 18 months it had become apparent that coal—British coal—could be hydrogenated in order to produce a large quantity of liquid product. At this stage, Imperial Chemical Industries, Ltd., began to take a real interest in the subject, and acquired a very large controlling interest in the British Bergius Syndicate. Since that time the Company had carried out a very splendid piece of work on a large scale, producing 160 gallons of petrol—refined, water-white spirit—from each ton of coal *treated*, not from each ton of coal *used*. He would not go so far as to agree with the Company's claim that petrol could be made from British coal by hydrogenation at a cost of 7d. per gallon, because he had not checked that figure, but he had checked a figure of 8d. or 9d. per gallon. With regard to the treatment of the oil he did not propose either to agree or disagree with Dr. Ormandy as to what the next step should be. He emphasised, however, that it was of vital importance to this country that our achievement, which had been reached only in this country, should be kept alive in some way, because, although it seemed that there is a flood of oil available at present, we did not know what would happen in the future.

The Prospect of De-Ashing Coal

Professor W. A. Bone, (representing the Chemical Society) endorsed all that had been said concerning the work carried out at the Billingham Works of Imperial Chemical Industries but expressed doubt that it was a right policy for this country to convert coal, by means of expensive processes, into oil. The point he urged was that it should be possible to make coal do a great deal of what oil is doing at present. He refused to believe that it was beyond the resources of science first to substantially de-ash coal, and secondly to explode in an internal combustion engine a flour-fine de-ashed coal as well as we could explode an oilspray. These were largely physical and engineering problems, and if they could be solved this country would be free from what some people might call its dependence, or the menace of its dependence, upon imported oil.

Mr. K. Gordon (Imperial Chemical Industries) in thanking Professor Lander for what he had said with regard to the work at Billingham on hydrogenation of coal, remarked that this was the first time that a Government representative had come into the scheme and found that the estimates put forward by other investigators were not wanting; in other words, Professor Lander had stated that the I.C.I. were speaking the truth with regard to their results and he was very much obliged to him for publicly recording that point of view. At the present time we imported 10 million tons of oil annually, of which 3 million tons was petrol. The price of petrol had varied considerably from time to time but from the figures for 1929 he calculated that if petrol was imported at 3½d. per gallon there would be no profit for the oil companies. At 5d. per gallon the profit would be 7½ per cent., and at 6d. per gallon it would be 10 per cent. The technical problem, therefore, which had to be faced was the production of petrol at, say, 5d. per gallon from coal costing 13s. to 15s. per ton delivered at site. In considering the application of this process, three questions presented themselves:—(a) Should we hydrogenate coal or the tars made from coal? (b) Is the process sufficiently developed for the immediate application to the large scale? (c) At what cost can the oil be made, and what chance was there of reducing it by future research work? It had been found that petrol could be made from coal at a cost of 7d. per gallon. The cost of making petrol from tars depended on the price at which tars were obtainable. At £2 per ton petrol could be made at 7d. per gallon and if tars could be obtained at or about this price then they should form the raw material for hydrogenation. If the price was above this it was better to proceed directly from coal. The proper course to pursue, however, was to build a plant for the hydrogenation of coal because the same plant could treat tars when the price of the tars was suitable. A plant built specifically for tar hydrogenation could not be used for hydrogenating coal without considerable alteration.

The Genesis of the Hydrogenation Idea

Dr. A. E. Dunstan (representing the Institution of Petroleum Technologists) said he was one of the few people present who could stand up for the imported petroleum industry. Why we should be afraid of £40,000,000 in imported oil and take no notice of £50,000,000 in imported bacon, he could not imagine. The craze to get oil from all sorts of curious sources, including coal, originated in a report made about 7 years ago by a Committee of the Senate of the United States, which raised the scare that mineral oil was rapidly approaching its end. That Committee pointed out that only 5 or 6 per cent of the liquid fuel required by the world could be got from the natural wells and that 95 per cent. would have to be obtained from shale, coal, lignites, etc. That, he believed, was the beginning of the hydrogenation idea, but since that time the new science of geo-physics had arisen. To-day the geo-physicist could tell reasonably accurately that a certain structure in the earth was potentially oil-bearing with the result that there was a production of over 200,000,000 tons of mineral oil.

Colonel W. A. Bristow, speaking on behalf of the Low Temperature Coal Distillers' Association of Great Britain, mentioned the advantages of low temperature coke and of the need for finding the best methods of treatment for the large quantity of oil and petrol produced in low temperature carbonisation. The oils so obtained were very different in character to other coal oils but very good marketable fractions had been produced and many million gallons had been sold. It was a fortunate occurence that motor spirit made from coal had usually far better anti-knock value than imported petrols, and the same was certainly the case with motor spirit made by the hydrogenation of low temperature oil. The cracking of coal oil, while difficult in the liquid phase, was rendered much easier in the vapour phase and a quantity of motor spirit had already been produced in England by the vapour phase cracking of low temperature oil. Most of the work up to the present, however, had been carried out on coal oil from which the tar acids had been extracted on account of their high value. Any great extension of this process might have the effect of swamping the tar acid market and thereby render it necessary to crack the oil with the tar acids in.

The Future of Fuel Research

Dr. E. W. Smith, representing the Institution of Chemical Engineers, said that meeting had been held with the object of trying to get, among fuel technologists, a proper perspective of what are the fuel problems in this country. The paper by Dr. Ormandy was probably the best compilation, as a perspective of the fuel problem, that had yet been put before the technical public up to date. Referring to the valuable work done by the Fuel Research Board he sincerely believed that a great deal more money would have been lost by the general public in low temperature carbonisation schemes but for the Fuel Research Board; the Board also took under its wing the subject of hydrogenation in its early days. He felt, however, the time had come when the whole situation in regard to fuel research should be reviewed. He would abolish the Fuel Research Board as an entity under Government control, and would divide its work. Research for the mining industry could be put into the hands of a research association for the mining industry. He would then put the whole of the carbonising research for the three industries —high temperature carbonisation, low temperature carbonisation and coke ovens—in the hands of Research Associations for the three industries and anything else left over should be done by a small *ad hoc* body brought into being as required. He did not suggest this because he was dissatisfied with the actual work done by the Fuel Research Board, but he was dissatisfied with it being under a Government Department, the reason being that there was provable waste through it being under a Government Department. At the same time, this opportunity should not be lost of congratulating Professor Lander on the work he had done during his period of office as Director of the Fuel Research Board.

Standing Advisory Committee Proposed

Where, asked Dr. Smith, was this discussion going to lead? Was this to be just talk and was that to be the end of it? There was a National Fuel and Power Committee that lived and moved and had a being and which did something, but it was now dead. He therefore suggested that the Institute of Fuel should be asked to take some action. To put the matter in order he proposed a resolution to the effect " That the Institute of Fuel be requested to call together a Committee representative of those Institutions largely interested in fuel, to act as a Standing Advisory Committee on all matters affecting the nations's fuel policy."

Colonel W. A. Bristow seconded the resolution.

The President, in recommending the resolution, said it would be a great pity if the Meeting closed without bringing the paper and the discussion to some purpose. He himself had been a member of the National Fuel and Power Committee—which was a Government Committee—but it had not sat for two years and he did not think it was at all likely that the members would be called together again.

Sir Henry Fowler suggested that the resolution should be put in the form of a recommendation to the Council of the Institute to consider the proposition and take the necessary action if it thought fit.

The resolution, put to the meeting in this form, was then carried unanimously .

Improvements in Textile Finishing

Soaping and Scouring Problems

A PAPER entitled " The Chemical Development of Modern Textile Finishing Products," was read by Dr. A. F. Kertess, of Chemnitz, at a meeting of the Manchester Section of the Society of Dyers and Colourists, which was held in the Lecture Room of the Manchester Library and Philosophical Society, on Friday, October 16, Mr. F. Scholefield, M.Sc., F.I.C., presiding.

Dr. Kertess stated that the useful properties of soap—its high wetting-out power and emulsifying and lathering qualities—varying with its composition, more than outweighed its disadvantages, which, briefly, were its sensitiveness to hard water and acids. With hard water it formed lime soap which was very objectionable and conducive to trouble in various ways. An excess of soap improved the condition of a soap bath, but not satisfactorily. White goods washed with soap were also liable to turn yellowish, while, if the soap was not washed out, the residues were capable of altering chemically through storage, becoming rancid and giving an objectionable smell.

The most important component of the soap used in the textile industry (Marseilles soap) was the sodium salt of oleic acid. With hard water the sodium or potassium in the oleate was replaced by calcium, to give the well-known lime salt, which, with the corresponding magnesium soap, so often caused trouble in bleaching, dyeing and finishing. Lime soap was very easily formed, causing flecks, giving rise to dyeing or bleaching difficulties and often to an unpleasant smell. A further disadvantage of soap lay in the fact that it could only be used in alkaline baths, and if only a small amount of acid was added to a soap solution a separation of free fatty acid immediately took place. This separated soap possesed no scouring action and could not be used for any textile processes. Attempts were consequently made long ago to improve upon the properties of soap, and, in the earlier days, these consisted of sulphonation of fatty acids.

Brilliant Avirols and Gardinols

After reviewing the research work of Schevreul, Scheurer-Kestner, H. Bertsch and others, Dr. Kertess proceeded to a consideration of the alky-sulphuric acid salts resulting from fatty alcohols which were already well-known as Brilliant Avirols (and Gardinols) and which had been on the market for the past year or so. Although these fatty alcohol sulphonates were known earlier, they had been developed solely through highly scientific work carried out in the laboratories of H. Th. Boehme, of Chemnitz, who recognised the extensive possibilities of them in consequence of their valuable properties. In the pure state the Brilliant Avirols formed stable, colourless crystals which were relatively soluble in water. Their most important characteristics included considerable resistance to acids, alkalis, and very many salts. They possesed very considerable emulsifying action of fats, grease, dirt, etc., and lathering properties, which made them specially useful, whilst, at the same time, their pronounced fatty character made them of special value for finishing. They were products which excelled soap in any of its properties and possessed, at the same time, the well-known characteristics of sulphonated oils. Their wetting-out abilities very greatly excelled those of the sulphonated oils, and were accompanied by a remarkable penetrative action and softening influence on any material treated with them.

By special methods fatty acids and esters, and, consequently, natural fats, which represented the fatty acid glycerl esters, could be hydrogenated to the alcohols. This could be effected by working under optimum conditions of a hydrogen pressure, above 100° C. Precipitated copper carbonate or nickel was used as the catalyst. By such methods chemical products had been obtained which were on the market under the name of Gardinols, the properties of which were absolutely ideal.

Improvement of Castor Oil for Use as Lubricant

THE chief drawback to the use of castor oil as a lubricant has been its acidity. According to the *Revue pétrolifère* (1931, No. 421) the free fatty acids may be successfully neutralised with triethylamin without any modification of the lubricating properties of the oil.

X-Rays in Industry

Industrial Research Committee's Report

FOR over three years a committee of the Department of Scientific and Industrial Research, under the chairmanship of Sir Willliam Bragg, have been investigating the application of X-ray methods to industrial research. Their report, published by H. M. Stationery Office (price 9d. net) describes the results that have been so far attained and urges a very much closer co-operation between the X-ray worker and the specialists in other sciences. Closer co-operation with the manufacturers is also plainly desirable, since the manufacturer clearly does not always select for X-ray examination the problems which are most amenable to such treatment. He tends to select problems in which all other methods have entirely failed, and in which the chances of X-ray methods being really useful are not very high. Often more fundamental researches dealing with the process as a whole rather than with some one particular aspect of it would probably be more valuable. To carry such co-operation into effect arrangements have been made for detailing suitable officers of the National Physical Laboratory for temporary work in selected industrial centres or in the laboratories of research associations with a view to the study on the spot of the problems of the industries which would be interested in the application of X-ray methods.

Structural Changes in Heat Treatment

The Report points out that although X-ray crystal analysis was first used in this country, and although on the pure research side we have played a leading part in its development, on the more practical side as an aid to industrial research much more widespread use has been made of the method abroad than at home. The work which the committee has been doing since it was set up in 1927 has been, to a certain extent, of an exploratory character. It has covered a wide range of subjects, although it is obvious that only a small fraction of the field of possible applications of the method has been examined. In many of the investigations it has been the aim in the first case rather to test the possibilities of the method than to endeavour to solve specific problems. One of the earliest problems investigated was the peculiar behaviour of tungsten permanent magnet steels, which, when heated to 900° C. lose their magnetic properties and are "spoiled," but recover their magnetism when further heated to 1,250° C. The X-ray patterns obtained recorded in detail the structural changes which took place during the heat treatment and showed that the spoiling was due to the formation of at least two definite chemical compounds, the presence of which chemical analysis had failed to reveal. The report also shows how X-rays were used to disclose changes in the crystal structure when metal was rolled or drawn into wire.

In conjunction with the Research Association of British Paint, Colour, and Varnish Manufacturers a survey of materials used in the paint industries was made with a view to ascertaining the possible applications of X-ray analysis in this field. This survey has emphasised the fact that the size of the elementary crystals is of great importance in connection with the quality of many paint materials. In these materials the ultimate crystal size is often extremely minute and entirely beyond the range of the microscope, but relative measurements can be obtained by observing the extent of the broadening of the diffraction lines. In another investigation artists' colours, which were indistinguishable in chemical composition, but which differed markedly in their behaviour, were examined and proved to be very different structurally. The X-rays shows the presence of an extra component in the inferior colour.

Graesser-Monsanto Chemical Works, Ltd.

THE directors and staff of this company sat down to a very enjoyable dinner on Friday, October 16, the the Florence Restaurant, Piccadilly, London. The company gathered together to welcome Commander Charles Belknap, the Vice-President of the Associated Company at St. Louis (The Monsanto Chemical Co.). The Chairman of the English Company made an interesting speech, which was ably supported by Major T. Knowles, sales director, and in his reply Commander Belknap voiced the confidence felt by the American Associated Company in the English company.

The Technique of Lead Welding

Simplifying the Fabrication of Plant and Equipment

LEAD welding by the oxy-acetylene process is the subject of an article in the current issue of *Oxy-Acetylene Tips,* which is published by the Technical Publicity Department of the Linde Air Products Co., of New York. The best results are said to be obtained with a flame containing a slight excess of acetylene. The blowpipe should be held so that the flame is perpendicular to the surface of the work. "With the inner cone almost touching the surface of the metal, heat the lead until it just melts, then lift the blowpipe quickly in order to prevent excess melting. The blowpipe flame is directed on the metal for an instant and quickly flipped away." Such are the directions given.

In most work with sheet lead, such as tank linings, lap joints are used, with a well-cleaned overlap of $\frac{1}{4}$ to $\frac{1}{2}$ in. Often forms are necessary to support the sheet, as the metal is too soft to remain in position unsupported. After the lap is in position, the joint should be tapped lightly with a wooden mallet in order to cause closer contact of the sheets. Each edge of the lap is then fillet-welded, using rod. When it is not possible to work from both sides, as for example, when a lining must be made in place, the butt-weld is preferable. The lead sheets must then be supported in position, and tack-welded to maintain alignment. Vertical seams should be started at the bottom, the work progressing upward.

Referring to the fabrication of small tanks for storing sulphuric acid, it is stated that these tanks were covered with steel shells to support and protect the soft lead lining. The piping for such tanks, as well as over 10,000 feet of pipe used in connection with alcohol extractors, forming part of this plant was all fabricated by oxywelding, sheet lead being rolled to the required thickness, and then welded along the longitudinal seams. After this lead piping was welded in place, an angle iron framework made up in halves by welding, was bolted around the lead pipe, to act both as a support and as a protection against injury. At the same works the welding shop was also called upon to fabricate a special lead-lined valve. Using an oxy-acetylene lead welding blowpipe, lead was applied to all inner surfaces, until the entire inside of the valve, in both open and closed positions, had a solid lead lining. This shows that, with a little ingenuity and close adherence to correct procedure, an oxy-acetylene welder can often fabricate parts that cannot be bought as standard equipment.

Annual Exhibition of Physical Apparatus

Preliminary Announcement

THE twenty-second annual exhibition of electrical, optical and other physical apparatus is to be held by the Physical Society and the Optical Society January 5-7, 1932, at the Imperial College of Science and Technology, South Kensington. As on previous occasions, there will be a Trade Section and also a Research and Experimental Section.

The trade section will comprise the exhibits of manufacturing firms, and preliminary invitations to these exhibitors are being issued, entries being asked for by October 28. The research and experimental section will be arranged in two groups: (a) exhibits illustrating the results of recent physical research, (b) lecture experiments in physics. The Exhibition Committee invites offers, from Research Laboratories and Institutions and from individual research workers, of exhibits suitable for inclusion in either of the groups. Accomodation for these exhibits will be provided in rooms separate from those devoted to the trade exhibits, no charge being made for space or catalogue entries. Offers of exhibits, giving particulars of space and other facilities required, should be communicated to the Secretary, Exhibition Committee, 1 Lowther Gardens, Exhibition Road, London, S.W.7. not later than November 9.

The section for apprentices and learners, which is also to be continued, has for its object the encouragement of craftsmanship and draughtsmanship in the scientific instrument trades. Apprentices and learners may exhibit, in competition, specimens of their work, providing they are in the regular employ of a firm which is exhibiting at the next Annual Exhibition, or once during the past three years.

Road and Transport Congress Exhibition

Some Interesting Chemical Papers

THE Public Works, Roads and Transport Congress Exhibition is to be held at the Royal Agricultural Hall, London, from November 16 to 21, under patronage of H. M. The King. From the list of exhibitors, it is evident that a remarkable display will be staged of modern plant and machinery used in the construction and maintenance of modern highways and the various other important engineering interests served by the Exhibition. So great has become the demand for stands at this year's Exhibition that all available space at the Royal Agricultural Hall, including the newly constructed hall, adjoining the main hall, will be fully occupied by exhibits.

The papers to be presented at the Congress for discussion include essays submitted in the competition promoted by the Public Works Congress Committee for papers dealing with important phases of local government work. The prizes for the winning essays will be presented during the Congress by the Minister of Health.

On Tuesday, November 17, at conferences under the auspices of the Institution of Gas Engineers, Mr. F. M. Birks (Gas Light and Coke Co.) will present a paper on "Waterless Gasholders," and Mr. H. Pickard (South Metropolitan Gas Co.) one on "Some considerations affecting the use of coal tar for road surfacing operations."

On Wednesday, November 18, "The use of coke breeze concrete in buildings" will be discussed in a paper by Dr. B. H. Knight (Borough of Deptford) and on the following day, with Dr. H. T. Calvert (Chemical Inspector to the Ministry of Health) in the chair, Mr. Granville Berry will read a paper on "The bio-chemistry and analysis of sewage as factors in the determination of the efficiency of various processes of purification." Mr. E. V. Suckling, of the Counties Public Health Laboratories, will discuss the problem of "The Sterilisation of Water by Catadyn Silver," and Mr. J. H. Garner, Chief Inspector to the West Riding Rivers Board, will submit a paper on "The Admission of Trade Effluents into Sewers."

British Association of Chemists

ANOTHER highly successful smoking concert was held by the London Section on October 16, at the Broad Street Restaurant, under the chairmanship of Mr. H. M. Morgan. In welcoming the members and their friends the Chairman said the object of these social gatherings was to give those attending an opportunity of becoming acquainted with fellow members, to renew old friendships, and to make new ones. The large audience fully entered into the spirit of the entertainment provided by an excellent concert party, organised by Miss Gertrude Mayo. The recitations of Miss E. Starkey, L.G.S.M., and the humorous stories by Mr. Fleet, advertisement manager of THE CHEMICAL AGE, were, as usual, much appreciated. The concert closed with "Auld Lang Syne" and the National Anthem.

Obnoxious Fumes from Artificial Silk Factory

AT a meeting last week of Jedburgh Town Council, Bailie Bayne, convenor of the Public Health Committee, made further references to the obnoxious fumes which issue from the North British Artificial Silk Co.'s factory at Jedburgh. He said that Dr. Birkett Wylam, chief inspector for Scotland under the Alkali Works Regulation Act, had visited the factory to investigate the nuisance accompanied by Dr. Adam, County Medical Officer, and as a result of the visit the company owning the factory had decided to undertake experiments to ascertain what particular gas was creating the smell. The experiments comprise the scrubbing of a sample of the gas with chemical solutions, and the adding of chlorine to observe whether this will destroy the objectionable matter. Dr. Wylam, added Bailie Bayne, though he was endeavouring to get information from other manufacturers regarding their methods of dealing with fumes arising from viscose processes, had suggested that the North British Artificial Silk Co. be allowed to carry out their experiments unhampered meantime.

Structure of Cellulose

INTEREST is being aroused in the forthcoming visit to Manchester of Professor Dr. Hermann Mark, who will deliver a paper on "The Significance of the New Cellulose Model in relation to the Technical and Dyeing Properties of the Fibre," to a joint meeting of the local sections of the Society of Dyers and Colourists, the Society of Chemical Industry, the Institute of Chemistry, and the Manchester Literary and Philosophical Society. Mr. F. Scholefield, chairman of the Society of Dyers and Colourists will preside at the meeting, which will be held on November 6 in the Manchester College of Technology, at 7 p.m. In recent years our knowledge of the structure of cellulose in a purely scientific sense, has advanced considerably. By a combination of chemical and X-ray data a cellulose model has been developed, which agrees well with the reactions known up to the present. This model affords an explanation of the more important technical problems. It will be shown in the paper that the high absolute value of the tenacity of natural cellulose, and alterations in the plastic deformation of cellulose are explained by the model, as well as its dyeing properties and changes produced during manufacturing processes. Those who are interested in this subject are cordially invited to attend the meeting.

Alliance Artificial Silk, Ltd.

IN the Companies Winding-up Court on Monday, October 19, Mr. Justice Eve had before him a petition for the winding-up of Alliance Artificial Silk, Ltd.

Mr. Jenkins said the matter had been before Mr. Justice Maugham on various occasions. The figures involved were large. The company had tried to get further time. He was instructed that the company had settled with all the other creditors except his clients. There were two supporting creditors for whom Mr. Evershed and Mr. Lindon appeared.

Mr. Buckmaster, for the company, said they desired to have an adjournment for three weeks, which the petitioners were willing to concede on terms that it was final.

Mr. Lindon said he represented three unsecured creditors. One had been paid, another had received a debenture and the third was still an unsecured creditor for £1,300. He did not oppose an adjournment.

Mr. Evershed did not object, and his lordship directed the case to stand over for three weeks.

Lord Brotherton's Bequests

LAST Wednesday, October 21, was the anniversary of Lord Brotherton's death, and the executors have now decided on the manner in which his bequests to charity shall be divided. Lord Brotherton left £20,000 each to Leeds, Birmingham and Wakefield. The executors have now agreed to the following gifts in Leeds:—

£2,000 to the General Infirmary; £1,000 to the Radium Appeal of the General Infirmary; £1,000 to the Public Dispensary; £1,000 to the Maternity Hospital; £1,000 to the Hospital for Women; £300 to the Herzi Moser Hospital; £2,500 towards the Brotherton Scholarship Fund; and £500 to found a post-graduate medical research fellowship, while more than 50 other social organisations are to receive sums varying from £500 to £100.

Grants to Wakefield include:—£5,000 to the Clayton Hospital and Wakefield General dispensary; £1,500 to the Wakefield District Victoria Nursing Association, £450 to the Wakefield Council of Social Service; £500 to the Wakefield City and District Deaf and Dumb Society; £5,000 to the Brotherton Charity Trust; £1,000 to the Wakefield Tradesmen's Benevolent Institution; £1,500 to the governors of the Wakefield Charities Wakefield Grammar School Leaving Exhibitions Fund; £1,500 to the governors of the Wakefield Charities Wakefield Girls' High School Leaving Exhibitions Fund; and £200 for "Brotherton" Physics and Chemistry Scholarships tenable at Manchester or Leeds University available for sons or daughters of Wakefield ratepayers or students attending Wakefield schools or colleges.

The Birmingham grants include:—£5,000 to the Hospital Centre Appeal Fund; £2,000 each to the General Hospital and the Birmingham Citizens' Society; and £1,000 each to the Cripples' Hospital, the Childen's Hospital and the Queen's Hospital.

Institute of Fuel

Sir Hugo Hirst's Presidential Address

IN the course of his presidential address delivered to members of the Institute of Fuel on Tuesday, October 20, Sir Hugo Hirst said the question of restoring prosperity to the coal industry was one in which the electrical industry is as much concerned as any other. Our national industrial growth began with coal and is sustained on coal, and it is only lately that the coal industry itself has ceased to share in the prosperity which it has brought. For the time being it is a sick industry. In making a diagnosis it is important to ascertain the true facts and to study them without the bias of either pessimism or undue optimism. The outstanding facts are that in spite of the demand made by oil, petrol, and other new sources of energy, coal is still the chief fuel of the world, and the world demand is increasing. The consumption of oil during 1929 was roughly about one-sixth of that of coal and less than that of brown coal. When, therefore, we hear the present time described as " the age of oil " and listen to facile prophecies of the death of coal, we realise how apt some people are to draw extreme conclusions from very restricted evidence.

While industrial depression is the main cause of the difficulties of the coal industry, no single cause can be accepted as covering the whole case, and no single cure can be regarded as adequate. In some quarters it is believed that fewer working hours and lower wages in the mines will do all that is required, but you know better than I that such economic adjustments will not bring the coal industry back to its former vigour. The disintegration which, on account of changes in world economic conditions, the coal situation has suffered during late years, has gone too far to be met with a mere adjustment of the miners' working conditions. Even if we were to reduce the labour costs in securing coal, we should not restore the former volume of demand. The production of coal must be reorganised on a scientific basis. We must contrive to raise coal more efficiently; to clean it so that the purposes of the user are better solved and the waste involved in the transport of mere dust is reduced; and we must grade the product more accurately for different classes of consumer.

Chemical Industry and the Election

Prominent Figures as Candidates

CHEMICAL industry is again represented in the list of candidates at the General Election, as the following list shows:—

Brig.-Gen. Sir William Alexander, Glasgow (Central), Nat. U., associated with many important British and American concerns; Lt.-Cdr. F. W. Astbury, Salford (West), Nat. U., chairman of the board of directors of the Delph calico-printing firm of Astbury and Pickford; Dr. G. C. Clayton, Cheshire (Wirral), Nat. U., director of Imperial Chemical Industries, Ltd.; Sir William Edge, Leicester (Bosworth), Nat. L., of William Edge and Sons, colour manufacturers; Major J. S. Courtauld, Sussex (Chichester), Nat. U.; Mr. Clement Davies, Montgomeryshire, Nat. L., director of Lever Brothers, Ltd.; Major A. G. Church (London University), Nat. Lab., General Secretary of the Association of Scientific Workers; Mr. F. Shoesmith, Glasgow (St. Rollox), Nat. U., chemical manufacturer; Sir Kenyon Vaughan-Morgan, Fulham (East), Nat. U., director and vice-chairman of the Morgan Crucible Co., Ltd.; Mr. G. le M. Mander (East Wolverhampton), Nat. L., chairman of Mander Brothers, Ltd.; Mr. Cyril Atkinson (Althincham), Nat. U., well known in the chemical industry as the referee under Part 1 of the Safeguarding of Industries Act; Sir Basil Peto (Barnstaple) Nat. U., for some years director of Morgan Crucible Co., Ltd.; Sir W. Wayland (Canterbury), who has published a number of essays on " Fermentation."

Markets for Paints and Varnishes in Algeria

A CONFIDENTIAL report on the market for paints and varnishes in Algeria has been prepared by the Department of Overseas Trade from information furnished by H. M. Consul-General at Algiers. United Kingdom firms desirous of receiving a copy of this report together with particulars of the Special Register service of information should communicate with the Department, 35 Old Queen Street, London, S.W.1., quoting Ref. B.X.7160.

Consolidated Platinums, Ltd.

Control of World Production

AFTER much discussion, accord has been reached between the important producers throughout the world as a result of the formatinon of a new English company, Consolidated Platinums, Ltd., having concluded contracts to buy and resell virtually all the new platinum production originating in the U.S.S.R., Canada, South Africa and Colombia, constituting the major portion of the world's output of this precious metal.

One of the new company's major functions will be to promote the use of platinum through an intensive research and market development programme and to facilitate co-operation between distributors, producers and consumers in this effort. The company concluded its contracts after six months of negotiations in London among the principal producers in the U.S.S.R., Canada, South Africa and Colombia, including Edelmetalle-Vertriebs, Aktiengesellschaft, the Mond Nickel Co., Johannesburg Consolidated Investment Co., New Consolidated Gold Fields and Compania Minera Choco Pacifico. The company will be managed by a committee consisting of representatives of the above companies, with Mr. P. L. Ginsburg and Mr. F. B. Howard White as joint managers. Sale of the platinum which the newly-formed company will buy will be through existing distributors and dealers; thus there will be change in present distribution methods. In connection with its promotional programme the company will make a study of various industrial fields and of the jewellery market with a view to finding new applications for platinum while at the same time making better known the present uses of this metal.

Institute of Chemistry

September Examinations

THE following announcements are made in respect of the Pass List for the September Examination of the Institute of Chemistry.

Examination in General Chemistry for the Associateship:—Botham, George Henry, B.Sc., (Lond.), Technical College, Hull, and Technical College, Birmingham; Coates, Harold Vincent, A.M.C.T., College of Technology, Manchester; Comrie, Alan Arthur Douglas, B.Sc., (Lond.), Battersea Polytechnic, London; Haddock, Leonard Arthur, B.Sc., (Lond.), Sir John Cass Technical Institute, London; Healey, Arthur Charles, B.Sc., (Lond.), Chelsea Polytechnic, London; McColl, Ada Frances, Technical College, Paisley; Porter, Ronald Francis, West Ham Municipal College, and Birbeck College, London; Sims, Rupert Charles, Technical College, Birmingham; Worms, Charles George Maurice de, M.A. (Cantab.), The University, Cambridge, and King's College, London.

Examination for the Fellowship:—In Branch C: Organic Chemistry, with special reference to Oils, Fats, etc.—Fenner, Joseph; Fletcher, Albert Edward. In Branch E: Chemistry, including Microscopy, of Food and Drugs, and of Water.—Hogan, George, F.I.C.; McLachlan, Thomas, A.C.G.F.C., F.I.C.; Bagchi, Kumar, Nath, B.Sc., M.B. (Calcutta); Dixon, Frederick, B.Sc. (Leeds); Freeland, David Michael; Lunt, James Gilbert, B.Sc. (Liv.); Richardson, Robert William; Scarlett, Claude Alexander, B.Sc. (Lond.). In Branch G: Industrial Chemistry, with special reference to Petroleum.—Gait, Alban James, M.Sc. (Lond.). In The Chemistry of Foods, with special reference to Jams and Jellies.—Robinson, Adeline Joan, B.Sc. (Lond.).

Scottish Coal Products Ltd.

Winding-Up Petition Dismissed

IN the Chancery Division on Monday, October 19, Mr. Justice Eve again had before him a petition for the compulsory winding-up of the Scottish Coal Products, Ltd., presented by John Archibald and Thomas McCracken, carrying an business as Gorehill Coal Co., Arden Colliery, near Airdrie, Lanark. Counsel for petitioners explained that the matter had been standing over for a week in order that a settlement might be arrived at. This had now been done, and he asked that the petition should be dismissed. Counsel for the company agreed, and his Lordship dismissed the petition accordingly.

From Week to Week

SIR ERNEST BENN will broadcast a talk on "The Case for Public Economy," on Monday, November 2, at 9.20 p.m.

IT IS REPORTED that a new company called Titanium Products Pty. (Ltd.), has been formed in Melbourne, with a capital of £100,000, to engage in the manufacture of titanium oxide pigments.

THE INTERNATIONAL NICKEL CO. of Canada has announced that the supplemental dividend warrants calculated to give effect to the dollar exchange rate current on September 30, amounting to 1¼d. per share, less tax at 5s., were posted on October 16.

THE ANNUAL MEETING of the Incorporation of Bonnetmakers and Dyers of the City of Edinburgh was held last week, when the following were appointed office-bearers for the ensuing year: Mr. Robert Peace, deacon; Mr. Kenneth Morham, treasurer; Councillor Stevenson, auditor; Messrs. James Brace, W.S., and S. K. Gifford Kerr, W.S., joint clerks.

A LARGE OIL-REFINING PLANT has been built at Csepel (Hungary) by the Shell Co., and a plant for the production of benzene is to be built at Budapest by the Municipal Gas Works. Much research work is in progress at the various experiment stations, looking toward the best possible utilisation of Hungarian brown coals.

WITH THE OBJECT of effecting the most efficient and economical distribution of their products in the United Kingdom and Ireland, the Anglo-Persian and Royal Dutch-Shell groups are creating a company to ensure the closest co-operation in their distributing businesses at present conducted by the British Petroleum and Shell-Mex companies.

THE PROPOSED MERGER of the Bethlehem Steel Corporation and the Youngstown Sheet and Tube Corporation has been definitely cancelled. This decision, according to the president of the Bethlehem Steel Corporation, has been taken in view of the changed conditions of trade. It was deemed impracticable to carry out the contract for the merger which had been signed in March, 1930, and the Bethlehem Corporation had exercised its option to cancel the agreement.

SEVERAL QUARRIES in County Wicklow, Ireland, are in operation producing a fine quartz suitable for the chemical industry. Crushing and grinding machinery has been installed in Wicklow and the present output is estimated at 10-15 tons per hour. The object of the Company which has been formed to operate these quarries is to win the market which is at present practically monopolised by Scandinavia and the United States. The first cargo of 200 tons was shipped from Wicklow to Liverpool last week.

THE HIGH COMMISSIONER FOR CANADA, in London, has informed the Federation of British Industries that the Department of External Affairs at Ottawa has altered its recent ruling with regard to currency certificates appended to invoices covering the entry of British goods into Canada. The ruling which has been in force for some little time was to the effect that a currency certificate must be appended to all invoices and had to be signed by a British bank before being transmitted to Canada. The Department of External Affairs has now modified that ruling and whilst a currency certificate is still required, it need not be signed by a British bank prior to the invoice leaving for Canada. It can now be appended to the invoice by the Canadian importer who can secure the signature of his own bank in Canada.

FOR THE VACANCY CREATED in the Wirral Division, Chester, by the unexpected decision of Mr. John Grace not to seek re-election at the coming Parliamentary election, the Wirral Conservatives have adopted Dr. G. C. Clayton, of Mollington, near Chester, as their candidate in support of the National Government, under Mr. Stanley Baldwin's leadership. Dr. George Christopher Clayton, son of Mr. John Shaw Clayton, of Standfield, Wavertree, Liverpool, was born in Liverpool in 1869, and was educated at Harrow, Liverpool University and Heidelberg University, finally taking his degree of Ph. D. In 1896 he joined the United Alkali Co. as research chemist, and within ten years was elected a director of the company, and is at present a director of the Imperial Chemical Industries, of which the United Alkali Co. ultimately became a part.

MR. E. R. MEADE, of York Chambers, 27 Brazennose Street, Manchester, has been appointed sole British Empire agent for Leo Sistig and Co., producers of the Sistig sizing machine used for sizing of fine rayon and silk yarns, and Sistig dyeing and finishing plant.

THE DISPOSAL OF SEAWEED that accumulates around the shores of the Isle of Man is now engaging the attention of the coastal municipal authorities and discussions are in progress with the Manx Government with a view to shipping the seaweed to England for conversion into chemical manure.

SHAREHOLDERS of Anglo-Cuban Asphalt and Bitumen, Ltd., are informed that, owing to the small response to the recently proposed issue of debentures, all cheques have been returned to applicants and it is now the directors' intention to wind up the company. The company, which was registered in 1927, has an issued capital of £221,177 in 2s. 6d. shares.

IMPORTS OF VANILLIN entered for consumption in the United States during the first eight months of 1931, amounting to 1,810 lb., was more than 90 per cent. decrease from the incoming shipments of 24,492 lb. in the corresponding period of 1930. The 1931 imports came from Germany (1,307 lb.) and Canada (502 lb).

THE SOVIET CHARGE D'AFFAIRES announces that Mr. Alexandre Ozersky, Deputy People's Commissar for Foreign Trade, has succeeded Mr. S. G. Bron as Trade Representative and Chairman of the Trade Delegation of the Union of Soviet Socialist Republics in the United Kingdom. Mr. Ozersky took up his duties on October 8.

THE PROCEEDINGS of the seventh convention of the National Fertiliser Association, held at White Sulphur Springs (United States), June 8-11, have now been printed, and copies are available on application to Mr. Chas. J. Brand, executive secretary and treasurer, at the Association's offices, 616 Investment Building, Washington, D.C., U.S.A.

RECENT WILLS include:—Mr. Samuel Parrish, B.Sc., A.R.C.S., F.C.S., of Teignmouth, Devon, for 37 years chemistry master at the City of Leeds School, £3,877 (net personalty £2,965).—Mr. Harold Sumner, of Standish, near Wigan, a director of the Bradford Dyers' Association and of the Wigan Coal and Iron Company, £286,877 (net personalty £278,933).

THE NON-RESIDENT LECTURER in chemistry at Cornell University for the present university term on the George Fisher Baker Foundation is Professor Cecil Henry Desch, who held the professorship of metallurgy at the University of Sheffield until last June, but who, on his return to England next February, will become superintendent of the metallurgical department at the National Physical Laboratory, Teddington.

DR. C. H. LANDER, D.Sc., director of Fuel Research, will open the session of Friday Evening Discourses at the Royal Institution, on November 20, his subject being "Oil and Petrol from Coal." On November 27, Sir Alfred Ewing, D.Sc., F.R.S., will review the work of Sir Charles Parsons. These discourses begin at 9 p.m. On November 3 and 10, at 5.15 p.m., there will be lectures on "The Combustion of Gases in Electric Discharges," by Professor G. I. Finch, of the Department of Chemical Technology, Imperial College of Science.

ACCORDING to the returns given in the *Ministry of Labour Gazette* for October, 16,567 persons were registered as wholly unemployed on September 21 in respect of the chemical industry in Great Britain and Northern Ireland; an additional 2,023 persons were affected by temporary stoppages. These figures do not include persons engaged in the manufacture of explosives (2,130 wholly unemployed, 517 temporary stoppages); paint, varnish, red and white leads (2,096 wholly unemployed, 163 temporary stoppages); and oil, glue, soap, ink and matches (8,554 wholly unemployed, 1,696 temporary stoppages).

Obituary

THOMAS ALVA EDISON, the famous American inventor, at West Orange, New Jersey, October 18, aged 84. At the age of 80 he commenced extensive research work with the object of producing synthetic rubber from golden rod, America's most prolific weed.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

351,832. VULCANISATION ACCELERATORS. Goodyear Tire and Rubber Co., 1144 East Market Street, Akron, Ohio, U.S.A. International Convention date, October 5, 1929.

An aldehyde is added slowly to cyclohexylamine without a solvent and with cooling, and the water is then evaporated. Alternatively, the reactants may be heated in a solvent such as alcohol. Suitable aldehydes include aldol, butyraldehyde, cortonaldehyde, heptaldehyde, acetaldehyde and formaldehyde. The products are vulcanisation accelerators.

351,844. DIPHENYL DERIVATIVES. Goodyear Tire and Rubber Co., 1144 East Market Street, Akron, Ohio, U.S.A. International Convention date, November 6, 1929.

An anti-oxidant for rubber is obtained by nitrating *p*-hydroxydiphenyl and reducing the nitro body with sodium hydrosulphite.

351,905. DYE INTERMEDIATES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, December 19, 1928.

An N-nitroaryl-cyclohexylamine is acylated and then reduced, *e.g.*, in acid solution with iron turnings, or with sodium sulphide to yield an N-acyl-cyclohexylamino-arylamine. This may be diazotised and coupled with azo components or the acid residue split off by saponification. Examples are given.

351,911. WETTING AGENTS. A. T. Böhme, Chemische Fabrik, 28 Grossenhainerstrasse, Dresden, Germany. International Convention date, December 24, 1928.

Wetting agents stable to inorganic or organic acids and solutions containing alkalies are obtained by sulphonating oils, fats or fattty acids with concentrated sulphuric acid in the presence of the products obtained by treating aliphatic mono- or polyvalent alcohols containing up to six carbon atoms in the molecule, or their organic or inorganic esters, ethers or hydroxy-alkylised derivatives with excess of sulphuric acid. Thus, castor oil may be sulphonated in the presence of the product obtained by sulphonating butyl alcohol with sulphuric acid or propionic ether with fuming sulphuric acid.

351,945. SYNTHETIC RESINS. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 16, 1929.

Alcohols containing more than three hydroxyl groups, excluding carbohydrates, are esterified with difficultly volatile monobasic aliphatic carboxylic acids of cyclic or open chain structure, simultaneously with resinic acids. This is effected by heating the mixture, with or without condensing agents such as gaseous hydrochloric acid, zinc chloride or boric acid, or by using a glyceride of the aliphatic carboxylic acid instead of the acid, glycerol being split off. The products may be subjected to further treatment such as vulcanisation or polymerisation. Polyhydric alcohols which may be used include pentaerythritol, sorbitol, mannitol and dulcitol, and suitable aliphatic acids include linoleic acids or the mixture of acids from the saponification of linseed oil, tung oil, fatty acids, ricinoleic acid, oleic acid, stearic acid, China wood oil acids, soya bean oil acids, naphthenic acids and montanic acids. The products may be used in coating compositions, varnishes, etc.

351,948. DYES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, April 27, 1929.

Derivatives of dibenzanthrones other than iodo derivatives are treated with anhydrous metal halides which supply halogen, *e.g.*, iron, aluminium, antimony or mercury halides, and with substances which lower the melting point, *e.g.*, alkali or alkaline earth metal halides, in the presence of catalysts such as iodine, and solvents or diluents such as halogen benzenes or naphthalenes, benzophenone, nitrobenzene, quinoline, pyridine or collidine. Several examples are given of the treatment of various derivatives of dibenzanthrones with halogenating agents under different conditions. The products dye violet to blue shades.

351,971. COMPLEX CALCIUM SALTS OF AROMATIC HYDROXYSULPHONIC ACIDS. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 1, 1930.

A solution of an alkali salt of a disulphonic acid of pyrocatechol or a hydroxy substitution product thereof is treated with a water-soluble calcium salt and the product neutralised with a solution of caustic alkali or calcium hydroxide. The products are water-soluble complex salts which have therapeutic properties.

352,004. DYES. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 31, 1930.

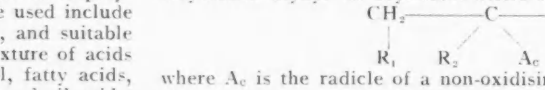
The monoazo dyestuffs from diazotised aminosulphosalicylic acids and resorcinol are treated with compounds of trivalent chromium. The products give brown or red shades on leather, fast to light.

352,056. ACETALDEHYDE CONDENSATION PRODUCTS. E. J. Boake and L. W. E. Townsend, 97 Carpenter's Road, Stratford, London. Application date, March 29, 1930.

Acetaldehyde is condensed with itself or with other aldehydes in the presence of water and a catalyst and also a hydrated salt such as sodium carbonate or sulphate decahydrate. The hydrated salt may also be the catalyst, *e.g.*, in the production of aldol. The water in the hydrated salt dissolves sufficient of the catalyst and absorbs the heat of the reaction, but external cooling may also be used. Aldol may be produced from acetaldehyde and sodium carbonate decahydrate at 10° C., and paraldehyde from acetaldehyde, sodium sulphate decahydrate and sodium bisulphate at 12° to 18° C.

352,070. ETHYLIDENE ETHER ESTERS. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 4, 1930.

Vinyl ethers of the general formula $CHR_1=CR_2.OR_3$ in which R_1 and R_2 are alkyl groups or hydrogen, and R_3 is an alkyl or aryl group, are treated with organic or non-oxidising inorganic acids in the presence of accelerators consisting of acid reacting agents such as boron fluoride, sulphuric or hydrochloric acid, thionyl chloride, sodium bisulphate or acid potassium fluoride, or organic halogen compounds capable of splitting off halogen hydracids such as ethyl-(β-chlorethyl)-ether, or neutral salts such as calcium chloride. The products are ethylidene- alykyl- or aryl-ether esters of the formula

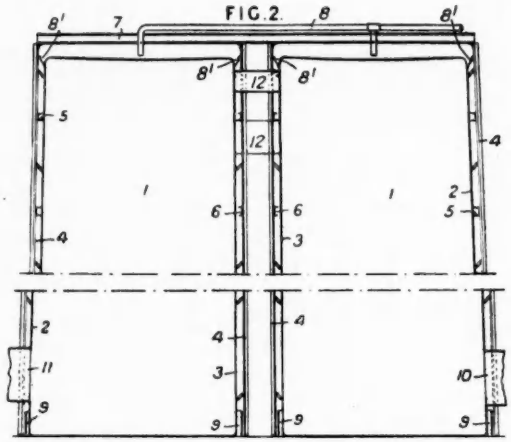


where A_c is the radicle of a non-oxidising acid, and are employed as intermediate products or as therapeutic, disinfectant, or pest-destroying agents.

352,016. SULPHURIC ACID CHAMBERS. Fison, Packard, and Prentice, Ltd., Ipswich, Chance and Hunt, Ltd., Oldbury, Worcester, and R. T. Maudsley, Witton Bank, Quinton, Birmingham. Application date, March 28, 1930.

A pair of sulphuric acid chambers 1, 1 are constructed of lead or other acid resisting material or rendered acid resisting by surface treatment, and are semi-circular in plan, the flat sides 3, being adjacent. The circular walls 2 may slope outwards, and the flat sides inwards, towards the bottom. The chambers are supported by T-section uprights 4 connected

by channel-section rings 5 and transverse bracing members 7. Cooling water is fed from the pipe 8 on to the top of each chamber, and then flows from serrated gutters 8¹ down the



walls. The gases pass from inlet 10 upwards through one chamber, through connecting pipes 12, and then downwards through the other chamber.

352,036. Purifying Kaolin. E. Muller, Kemmlitz-Mügeln, Leipzig, Germany. Application date, January 4, 1930.

Kaolin or other clay and water containing water-glass are supplied to a washing apparatus at such relative rates that streaks are formed on the surface of the suspension, *e.g.*, when the suspension is of specific gravity of 1.08-1.09. The suspension is then neutralised and filter-pressed without settling. The clay remaining in the filtrate may be recovered.

352,137-8. Insoluble Borates. H. Blumenberg, 640 South Arden Boulevard, Los Angeles, U.S.A. Application dates, April 28 and 29, 1930.

352,137. Borax ores are ground and dissolved in hot water and the chloride or nitrate of calcium, barium, or strontium is added. The precipitate, *e.g.*, calcium borate hexahydrate is calcined at 500°-700° F. to remove water of crystallisation and may then be used in varnish and paint driers, or for the production of boric acid

352,138. This is an addition to 352,137 and consists in adding calcium nitrate solution of borax ore to obtain calcium borate and sodium nitrate, which are then separated and the nitrate evaporated.

352,164. Purifying Hydrocarbon Oils. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 17, 1930.

Crude coke-oven benzol is purified by refluxing with 1-3 per cent. of maleic acid or anhydride and the purified oil separated by distillation and then further purified by treating with sodium hydoxide or carbonate. Impurities such as cyclopentadiene, butadiene, and heterocyclic compounds, such as pyridine are thereby removed. The residue from the purification may be crystallised from benzene to obtain methylene tetrahydro phthalic acid anhydride or may be esterified with a polyvalent alcohol to form a resin.

352,258. Stabilising Fertilisers. A. Mentzel, 2 Nordernstrasse, Schöneberg, Berlin. International Convention date, July 19, 1929.

Unstable salts such as ammonium bicarbonate are preserved by subliming on to the granules a more stable fertiliser such as ammonium sulphate or chloride or urea.

352,264. Calcium and Other Cyanamides. N. Caro, 97 Hohenzollerndamm Dahlem, Berlin, and A. R. Frank, 138 Kurfürstendamm, Halensee, Berlin. Application date, July 14, 1930.

Material containing calcium carbide in finely powdered or finely fragmented form is rolled or shaped under pressure with the addition of solid or liquid admixtures which facilitate cohesion and promote the subsequent nitrogenation. The material is then subjected to the action of gases containing nitrogen.

352,307. Potassium Nitrate and Sodium Bicarbonate. Soc. Chimique de la Grande Paroisse Azote et Produits Chimiques, 40 Rue du Colisée, Paris. International Convention date, November 15, 1929.

Sodium nitrate is treated with potassium chloride to obtain potassium nitrate. Separated sodium chloride and the mother liquor from the crystallisation of potassium nitrate are mixed, concentrated and treated with carbon dioxide, ammonia and water to obtain sodium bicarbonate and a fertiliser containing ammonium chloride and potassium nitrate. Natural ores of potassium such as sylvinite may be used in this process and washing of the separated sodium chloride is unnecessary.

352,309. Ammonium Salts. Union Chimique Belge, Soc. Anon., 61 Avenue Louise, Brussels. International Convention date, November 7, 1929.

Crystallised tri-ammonium phosphate is treated with a strong solution of phosphoric acid containing 50 per cent. P_2O_5 until the product is neutral to phenolphthalein. The resulting solid diammonium phosphate may be dried in vacuo at 60° C. If nitric acid or hydrochloric acid is employed instead of phosphoric acid, a mixture of ammonium nitrate or chloride and di-ammonium phosphate is obtained. If sulphuric acid is used, a mixture of mono-ammonium phosphate and neutral ammonium sulphate is obtained.

352,367. Phosphoric Anhydride and Phosphoric Acid. Metallges Akt.-Ges., 45 Bockenheimer Anlage, Frankfort-on-Main, Germany. International Convention date, November 29, 1929.

Molten phosphorus is passed through a vertical hollow shaft to a horizontal rotating disc and the resulting finely divided phosphorus is treated with air, with or without water, to obtain phosphoric anhydride or phosphoric acid. The air supply may be introduced just below the disc and then allowed to rise around the edge of the disc. The disc may rotate in a funnel-shaped casing so that the atomised phosphorus only comes into contact with the air above the casing. Water may be fed on to the disc with the phosphorus.

352,424. Ammonium Phosphate and Hydrogen. Soc. d'Etudes Scientifiques et d'Entreprises Industrielles, Ougrée, Belgium. Assignees of E. Voituron, Sclessin Ougrée, Belgium. International Convention date, January 22, 1929.

A mixture of water, phosphorus and ammonia is heated to 350° C. at a pressure of 250 atmospheres in the presence of a metal of the iron group or a salt thereof to obtain ammonium phosphate and hydrogen. If the ammonia and water are in excess, the catalyst metal is not attacked, so that the reaction vessel may consist of steel. The hydrogen obtained is washed to recover the ammonia content and is then purified for use in the synthesis of ammonia. The ammonium phosphate solution obtained is concentrated by heating under reduced pressure and the slightly alkaline steam evolved is condensed and used in the process.

352,477. Sulphur. Patentaktiebolaget Grondal-Ramen, 3 Norrmalmstorg, Stockholm, and N. E. Lenander, Lokkenverk, Norway. Application date, April 5, 1930.

In the smelting of sulphide ores such as copper pyrites with solid reducing agents such as coke in an enclosed blast furnace, the blast is adjusted so that the gases contain no free oxygen. The gases are passed over a catalyst, such as iron or aluminium oxide produced from the hydrate and containing some combined water, or alternatively, bauxite may be used. The catalyst is maintained at 350°-400° C., and the gases should be above 350° C. Sulphur dioxide is formed and reacts with the carbon bisulphide, oxysulphide, and sulphuretted hydrogen to form elementary sulphur. Liquid sulphur is withdrawn and the remaining sulphur removed in an electric precipitator. Excess of sulphur dioxide is removed by reduction with carbon monoxide, preferably as producer gas.

Specifications Accepted with date of Application

357,956. Conversion of gaseous hydrocarbons into hydrogen. Union Chimique Belge Soc. Anon. August 31, 1929.

357,959. Azo-dyestuffs, Manufacture of. W. W. Groves. (*I.G. Farbenindustrie Akt.-Ges.*). June 21, 1930.

357,985. Dichloro-2-methyl-anthraquinones. A Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). June 30, 1930.

357,986. Stable water-soluble yellow sulphuric acid ester, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). June 30, 1930.

358,000. Substantially pure chemical compounds or metals, Production of. A. S. Burman and I. Rennerfelt. June 25, 1929.

358,032. Esters of anthrahydroquinones, Production of. D. A. W. Fairweather, J. Thomas, and Scottish Dyes, Ltd. March 25, 1930.

358,063. Alloy steels. Brown Bayley's Steel Works, Ltd., and H. Bull. March 27, 1930.

358,066. Condensation products of the anthraquinone series, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). April 3, 1930.

358,037. Purification and concentration of emulsions of sulphurised fatty-oil products. Imperial Chemical Industries, Ltd., H. M. Bunbury and R. B. F. F. Clarke. May 2, 1930. Addition to 343,533.

358,039. Purifying zinc ore, Process and apparatus for. O. Gerlach. May 27, 1930.

358,068. Polymerization of unsaturated hydrocarbons, in particular of the olefine series. H. D. Elkington. (*Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij*). April 29, 1930.

358,055. Azo dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). July 2, 1930.

358,056. Carbazole-2 : 7-disulphonic acid, Manufacture of. A Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). July 2, 1930.

358,074. Nitrogenous vat dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). May 31, 1930.

358,078. Vat-dyestuffs and intermediates, Production of. J. Thomas, R. F. Thomson, W. Smith, and Imperial Chemical Industries, Ltd. June 4, 1930.

358,095. Polyhydric-alcohol-polybasic-acid condensation products, Derivatives of. Imperial Chemical Industries, Ltd., and W. Baird. July 3, 1930.

358,113. Complex salts of aromatic compounds, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). July 5, 1930.

358,114. Hydroxy alkylamines, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). July 5, 1930.

358,115. Masses resembling hard rubber, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 5, 1929.

358,124. Hydrocarbons of low boiling point from carbonaceous materials, Manufacture of. V. Moncada. April 8, 1930.

358,136. Azo dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). July 8, 1930.

358,146. Azo dyes containing chromium, Manufacture of. Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann. November 13, 1929.

358,178. Carbon black, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). July 28, 1930.

358,180. Valuable products from carbonaceous materials, Manufacture of. H. D. Elkington. (*Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij.*) July 29, 1930.

358,186. Polycyclic compounds containing two CO groups, Manufacture of. I.G. Farbenindustrie Akt.-Ges. August 8, 1929. Addition to 263,163.

358,230. Piperidine pentamethylenedithiocarbamate, Manufacture of. Imperial Chemical Industries, Ltd. (*E. I. Du Pone de Nemours and Co.*). September 12, 1930.

358,249. Carbon disulphide, Production of. Chemische Fabrik Kalk Ges. and H. Oehme. September 20, 1930.

358,276. Cyanamides of the alkaline earth metals, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). October 6, 1930.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Blagden, J. W., Howards and Sons, Ltd., and Huggett, W. E. Manufacture of compounds from terpene alcohols and hydrocaromatic alcohols. 28679. October 15.

British Industrial Solvents, Ltd., and Langwell, H. Polishes, &c. 28665. October 15.

Caddick, A. J., and Cargo Fleet Iron Co., Ltd. Production of barium carbonate. 28422. October 13.

Carpmael, A. (*I.G. Farbenindustrie Akt.-Ges.*). Manufacture of yellow vat dyestuffs. 28447. October 13.

—— Manufacture of acid wool dyestuffs. 28448. October 13.

—— Accelerators for vulcanization of rubber. 28584. October 14.

Carter, P. G. Dyestuffs. 28782. October 16.

Chemische Fabrik vorm. Sandoz. Preparation of stable supersaturated calcium gluconate solutions. 28549. (Germany, October 14, 1930.)

Coley, H. E. Production of volatile metals from ores. 28797. October 16.

Denny, P. W. Stabilization of chlorinated hydrocarbon. 28596. October 14.

Du Pont de Nemours & Co., E. I., Lawson, W. E., and Sandborn, L. T. Polymerization of vinyl derivatives &c. 28597. October 14.

—— Insecticides, &c. 28841. October 16. (United States, October 16, '30.)

Fabry, R. F. F. Neutralising acid sulphur compounds in products of combustion. 28267. October 12.

Foamite Firefoam, Ltd., and Gilbert, V. G. W. Production of fire-foam. 28291. October 12.

Frischer, H. Structural material withstanding halogen hydracids. 28476. October 13.

Groves, W. W. (*Chemische Fabrik Von Heyden Akt.-Ges.*). Thorium-dioxide sols. 28680. (October 15.

Hancock, T. R. Apparatus for emulsifying liquid mixtures. 28504. October 14.

Hills, H. G. Manufacture of white lead. 28650. October 15.

(I.G. Farbenindustrie Akt.-Ges.). Johnson, J. Y. Production of anti-knock engine fuels. 28273. October 12.

—— Johnson, J. Y. Production of non-inflammable tar products, &c. 28556. October 14.

—— Johnson, J. Y. Manufacture of dressings fast to washing. 28557. October 14.

—— Johnson, J. Y. Apparatus for distillation of oils. 28805. October 16.

—— Johnson, J. Y. Apparatus for working up gases containing hydrocarbons in electric arcs. 28806. October 16.

I.G. Farbenindustrie Akt.-Ges. Production of chlorocresols. 28916. October 17. (Germany, October 29, '30.)

Imperial Chemical Industries, Ltd. Crawford, J. W. C. Production of polymerized unsaturated ester materials in sheet form. 28457. October 13.

—— Fleming, J. S. B. Sheet formation from plasticized polymerized unsaturated esters. 28455. October 13.

—— Crawford, J. W. C., Fleming, J. S. B. Manufacture of splinterless glass. 28459. October 13.

—— Horsley, G. F. Recovery of ethylene. 28460. October 13.

—— Tyrer, D. Burning pyrites. 28461. October 13.

—— Stabilisation of chlorinated hydrocarbon. 28596. October 14.

—— Reducing inflammability of rubber preparations. 28728. October 15.

—— Tyrer, D. Burning pyrites, &c. 28729. October 15.

—— Thomson, R. F. Dyestuffs. 28782. October 16.

—— Brownsdon, H. W., and Corner, G. H. C. Manufacture of separable fasteners. 28907. October 17.

—— Degreasing materials. 28908, 18900. October 17.

Laporte, Ltd., B. Manufacture of hydrogen peroxide. 28582. October 14.

Larrowe-Suzuki Co. Processes of manufacturing or recovering glutamic acid, &c. 28652. October 15. (United States, April 29.)

Mentzel, A. Manufacture of potash. 28559. October 14. (Germany, October 24, '30.)

Mott, O. E. Distillation of liquids. 28591. October 14.

Power Gas Corporation, Ltd., Rambush, N. E., and Grisenthwaite, A. T. Carbonisation of coal. 28887. October 17.

Progil Soc. Anon. Manufacture of synthetic tanning-substances. 28810, 28811. October 16. (France, October 17, '30.)

Scorah, L. V. D., Triplex Safety Glass Co., Ltd., and Wilson, J. Preparation &c. of unsaturated esters. 28900. October 17.

Report on Purchase and Distribution of Radium

THE Reports of the Radium Trust and of the Radium Commission which were issued on October 14, show the progress made with the purchase of radium and its distribution to the radium centres throughout the country. The Trust was established by the Thank-Offering Fund of £150,000, to which was added a contribution of £100,000 from the Exchequer, and these sums have been reinforced by further private donations. The total amount of radium ordered or approved for purchase now amounts to nearly 25 grammes, of which 21.8 grammes have actually been delivered. Of this, about 17 grams have already been delivered to the centres. The cost of radium is approximately £10,000 per gram, and the cost of providing containers and filling it into these is about £1,350 per gram.

Institution of Chemical Engineers

THE Council has appointed Mr. H. W. Cremer, M.Sc., F.I.C., to be honorary secretary of the Institution in the place of the late Professor J. W. Hinchley.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID, ACETIC, 40% TECH.—£18 15s. per ton d/d address U.K. in casks.

ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8½d. per lb., d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 19s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £15 10s. per ton; granulated, £12 10s. per ton; powder, £16 per ton. (Packed in 1 cwt. bags, carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.

CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3¼d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 11d. to 2s. 4d. per gall.; pyridinised industrial, 2s. 1d. to 2s. 6d. per gall.; mineralised, 3s. to 3s. 4d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4¼d. per lb. net d/d U.K., discount according to quantity; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb. ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8½d. per lb. d/d U.K.

SALAMMONIAC.—First lmp, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.

SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77° E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS, CAKE, GRANULAR, AND POWDER.—3½d. per lb. net d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3¾d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SILICATE., 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton, d/d in drums. Crystals—Spot, £8 5s. per ton, d/d in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton; d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5¼d. to 6¼d. per lb. Crude 60's 1s. to 1s. 1d. per gall. August/December.

ACID CRESYLIC 99/100.—1s. 8d. to 1s. 9d. per gall. B.P., 3s. 6d. per gall. 97/99.—Refined, 1s. 11d. to 2s. 2d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.

ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.

BENZOLE.—Prices at works: Crude, 7d. to 7½d. per gall.; Standard Motor, 1s. 2d. to 1s. 3d. per gall. 90%.—1s. 3d. to 1s. 4d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.

TOLUOLE.—90%, 1s. 9d. to 1s. 10d. per gall. Pure, 1s. 11d. to 2s. per gall.

XYLOL.—1s. 8d. to 1s. 9d. per gall. Pure, 1s. 11d. to 2s. per gall.

CREOSOTE.—Standard specification, for export, 4¾d. to 5d. net per gall. f.o.b.; for Home, 3¾d. per gall. d/d.

NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 5d. to 1s. 6d. per gall. Solvent, 90/190, 1s. to 1s. 5d. per gall.

NAPHTHALENE.—Purified Crystals, £10 per ton, in bags.

PITCH.—Medium soft, 60s.-65s. per ton, in bulk at makers' works.

PYRIDINE.—90/140, 3s. to 3s. 3d. per gall. 90/160, 3s. 3d. to 3s. 6d. per gall. 90/180, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID GAMMA.—Spot, 3s. 3d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

p-CRESOL 34.5° C.—1s. 9d. per lb., in ton lots.

DICHLORANILINE.—2s. 5d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.

DINITROBENZENE.—7¾d. per lb.

DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d.-8d. per lb.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb., d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 9d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 10½d. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra, d/d buyers' works.

NITRONAPHTHALENE.—8¾d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £6 10s. per ton. Grey, £11 to £13 per ton. Liquor, 7d. to 9d. per gall.

ACETIC ACID, TECHNICAL, 40%.—£15 15s. per ton.

ACETONE.—£63 to £65 per ton.

AMYL ACETATE, TECHNICAL.—85s. to 95s. per cwt.

CHARCOAL.—£6 10s. per ton, according to grade and locality.

IRON LIQUOR.—24°/30° Tw., 9d. to 1s. 2d. per gall.

METHYL ACETONE, 40/50%.—£43 per ton.

RED LIQUOR.—16° Tw., 7½d. to 9d. per gall.

WOOD CREOSOTE.—9d. to 1s. 6d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—1s. per gall. Solvent, 3s. 6d. to 4s. per gall.

WOOD TAR.—£1 10s. per ton.

BROWN SUGAR OF LEAD.—£30 to £32 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 1d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 5d. to 1s. 7d. per lb.

BABYTES.—£7 to £8 10s. per ton, according to quality.

CADMIUM SULPHIDE.—3s. 3d. to 3s. 6d. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON, BLACK.—3½d. to 4½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—2s. 6d. per lb.

INDIARUBBER SUBSTITUTES, WHITE.—4d. to 5½d. per lb.; Dark, 4d. to 4½d. per lb.

LAMP BLACK.—£30 per ton.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£11 10s. to £15 15s. per ton.

MINERAL RUBBER "RUPRON."—£17.

PIPERIDINE RUBBER ACCELERATORS.—P.P.D., 10s. 6d. to 11s. 6d. per lb.; Z.P.D., 7s. to 7s. 6d. per lb.; L.P.D., 6s. 6d. to 7s. per lb.

SULPHUR CHLORINE.—4d. to 7d. per lb., according to quality.

SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.

SULPHUR PRECIP. COMMERCIAL.—£40 to £45 per ton.

VERMILION, PALE OR DEEP.—6s. 8d. to 6s. 10d. per lb.

ZINC SULPHUR.—10d. to 1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 4d. to 1s. 6d. per lb.

ACID, ACETIC, PURE, 80%.—£37 5s. per ton d/d address U.K. in casks.

ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.

ACID, BENZOIC B.P.—1s. 10d. per lb., for synthetic product. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £34 per ton; powder, £35 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 0½d. per lb., less 5%.

ACID, GALLIC.—2s. 9d. per lb., for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—6d. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. for 28-lb. lots; Resublimed, 8s. 6d. per lb. for 28-lb. lots, d/d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 0½d. per lb., less 5%.

AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.

AMMONIUM BENZOATE.—3s. 6d. per lb.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—6s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.

ATROPHINE SULPHATE.—7s. to 7s. 6d. per oz., according to quantity.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—2s. 10d. per lb.

BISMUTH CARBONATE.—7s. 9d. per lb.

BISMUTH CITRATE.—9s. 2d. per lb.

BISMUTH SALICYLATE.—7s. 9d. per lb.

BISMUTH SUBNITRATE.—6s. 6d. per lb.

BISMUTH NITRATE.—Cryst. 5s. 1d. per lb.

BISMUTH OXIDE.—11s. 1d. per lb.

BISMUTH SUBCHLORIDE.—10s. 9d. per lb.

BISMUTH SUBGALLATE.—7s. 4d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth sales respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W.Qts. 1s. 2d. per lb.; 6 W. Qts. 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts. 9½d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts., 9½d. per lb.

BORAX B.P.—Crystal, £23 10s. per ton; powder, £24 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

BROMIDES, B.P.—Ammonium, 1s. 7d. per lb.; potassium, 1s. 4d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s 6d. per lb. Prices for 1-cwt. lots.

CAFFEIN, PURE.—6s. 6d. per lb.

CAFFEIN CITRAS.—5s. per lb.

CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., according to quantity.

CAMPHOR.—Refined flowers, 2s. 11d. to 3s. 1d. per lb., according to quantity; also special contract prices.

CHLORAL HYDRATE.—2s. 11½d. to 3s. 1½d. per lb.

CHLOROFORM.—2s. 4d. per lb.

ETHERS.—S.G. .730—1s. 1d. to 1s. 2d. per lb., according to quantity; other gravities at proportionate prices.

FORMALDEHYDE, 40%.—30s. per cwt. in barrels, ex wharf.

GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.

HEXAMINE.—1s. 10d. to 2s. per lb., according to quantity.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.

HYDROQUINONE.—4s. 7d. per lb. in 1-lb. lots; 3s. 5¾d. per lb. in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; for 28-lb. lots.

IRON AMMONIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 7d. per lb. list price.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8¼d. to 8¾d. per oz.

MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.

MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 13s. 6d. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 9s. 9d. per lb., according to quantity; Liquid (95%), 8s. per lb.

MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 9s. 4d. to 9s. 5d. per lb., levig., 8s. 10d. to 8s. 11d. per lb.; Corrosive Sublimate, Lump, 7s. 5d. to 7s. 6d. per lb., Powder, 6s. 8d. to 6s. 9d. per lb.; White Precipitate, Lump, 7s. 5d. to 7s. 6d. per lb.; Powder, 7s. 6d. to 7s. 7d. per lb.; Calomel, 8s. to 8s. 1d. per lb.; Yellow Oxide, 8s. 7d. to 8s. 8d. per lb.; Persulph, B.P.C., 7s. 9d. to 7s. 10d. per lb.; Sulph. nig., 8s. 2d. to 8s. 3d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 3d. to 1s. 4d. per lb.

PARAFORMALDEHYDE.—1s. 6d. per lb.

PARALDEHYDE.—1s. 1d. per lb.

PHENACETIN.—3s. 9d. to 4s. 1d. per lb.

PHENOLPHTHALEIN.—5s. to 5s. 2½d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—90s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P., 1s. 7d. per lb. for 28-lb. lots.

POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.

POTASSIUM IODIDE.—B.P., 20s. 9d. to 23s. 9d. per lb., as to quantity.

POTASSIUM METABISULPHITE.—50s. per cwt. d/d London, kegs free.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.

QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.

SACCHARIN.—43s. 6d. per lb.

SALICIN.—16s. 6d. to 17s. 6d. per lb., according to quantity.

SILVER NITRATE.—10d. per oz. for 500-oz. lots, sticks, 2d. per oz. extra.

SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.

SODIUM BENZOATE B.P.—1s. 6d. to 1s. 7½d. per lb.

SODIUM CITRATE.—B.P.C. 1911, 1s. 4d. per lb. B.P.C. 1923, and U.S.P., 1s. 8d. per lb., for 28-lb. lots.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—73s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.

SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS.—£26 to £28 per ton, according to quantity. Delivered U.K.

STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.

TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.

THYMOL.—Puriss, 6s. 1½d. to 7s. per lb., according to quantity. Natural, 12s. per lb.

ZINC STEARATE.—1s. 4d. to 1s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—8s. 9d. per lb.

AMYL ACETATE.—2s. 3d. per lb.

AMYL BUTYRATE.—4s. 9d. per lb.

AMYL CINNAMIC ALDEHYDE.—8s. 6d. per lb.

AMYL SALICYLATE.—2s. 6d. per lb.

ANETHOL (M.P. 21/22° C.).—5s. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE ALCOHOL.—1s. 9d. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 9d. per lb.

BENZYL BENZOATE.—2s. 2d. per lb.

CINNAMIC ALDEHYDE NATURAL.—10s. 6d. per lb.

COUMARIN.—12s. per lb.

CITRONELLOL.—7s. 3d. per lb.

CITRAL.—6s. per lb.

ETHYL CINNAMATE.—6s. 9d. per lb.

ETHYL PHTHALATE.—2s. 6d. per lb.

EUGENOL.—7s. 6d. per lb.

GERANIOL.—6s. to 10s. per lb.

GERANIOL (FROM PALMAROSA).—14s. per lb.

HELIOTROPINE.—5s. 6d. per lb.

ISO EUGENOL.—9s. per lb.

LINALOL (EX BOIS DE ROSE).—5s. 6d. per lb.

LINALYL ACETATE, EX BOIS DE ROSE.—7s. 6d. per lb. Ex Shui Oil, 7s. 6d. per lb.

METHYL ANTHRANILATE.—6s. per lb.

METHYL BENZOATE.—4s. 3d. per lb.

MUSE XYLOL.—6s. 6d. per lb.

PHENYL ETHYL ACETATE.—10s. per lb.

PHENYL ETHYL ALCOHOL.—8s. 3d. per lb.

RHODINOL.—40s. per lb.

SAFROL.—1s. 6d. per lb.

VANILLIN, EX CLOVE OIL.—14s. 6d. to 16s. 6d. per lb. Ex Guaiacol.—13s. to 15s. per lb.

Essential Oils

ANISE OIL.—2s. 4d. per lb.

BERGAMOT OIL.—7s. 9d. per lb.

BOURBON GERANIUM OIL.—17s. per lb.

CAMPHOR OIL.—White, 75s. per cwt.; Brown, 75s. per cwt.

CANANGA.—Java, 7s. per lb.

CINNAMON OIL LEAF.—4s. per oz.

CITRONELLA OIL.—Java, 2s. 6d. per lb., c.i.f. Pure Ceylon, 2s. per lb.

CLOVE OIL, 90/92%.—6s. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 4d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 9s. per lb.

LEMON OIL.—4s. 3d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, October 20, 1931.

THERE has been a brisk demand for the various chemicals during the current week with prices firm and in many cases nominal.

General Chemicals

ACETONE.—In active demand and firm at £62 per ton.
ACID, ACETIC.—Firm at £36 5s. to £38 5s. per ton for Technical and £37 5s. to £39 5s. per ton for Pure 80% in daily demand.
ACID, CITRIC.—Easier at 1s. 1d. per lb., less 5%.
ACID, FORMIC.—Firm at about £46 per ton with an active demand.
ACID, OXALIC.—Very firm at £42/43 per ton and in good request.
ALUMINA SULPHATE.—Firm at £8 10s. to £9 10s. per ton.
ARSENIC.—Nominal with supplies still difficult for early delivery.
CREAM OF TARTAR.—87s. 6d. to 90s. per cwt., less 2½%.
FORMALDEHYDE.—In good steady demand and firm at £27/28 per ton.
LEAD ACETATE.—White £37/39 per ton, Brown £1 per ton less.
LITHOPHONE.—Firm at about £22 per ton.
BICHROMATE OF POTASH.—Firm at 4½d. per lb.
POTASSIUM CHLORATE.—£32/34 per ton.
PERMANGANATE OF POTASH.—In good steady request at 6½d. to 6¾d. per lb.
POTASSIUM PRUSSIATE.—In short supply at about 8½d. per lb.
SODA BICHROMATE.—Firm at 3½d. per lb. with a steady demand.
SODA CHLORATE.—Firm at £28/30 per ton, with stocks becoming short.
SODA PRUSSIATE.—Firm at 4¾d. to 5½d. per lb.
TARTAR EMETIC.—Unchanged at about 11d. to 11½d. per lb.

THE following additional market conditions have been reported :—

CARBOLIC ACID.—There is little change to report since we last wrote you, and while we still hear of improving export prices, the home makers' prices are substantially unchanged.

METHYL SALICYLATE.—Business is quiet at the new prices of 1s. 4½d. to 1s. 5½d.

SODIUM ACETATE.—Brisk business is being done owing to the apparent absence of cheap supplies that were formerly on offer, the general market price remaining at £20 per ton.

CRESYLIC ACID.—Is in fair inquiry and prices are distinctly firm—97/99% quality is offered at 1s. 7d. to 1s. 8d. with 99/100% grades at 1s. 10d. to 2s. according to quality, composition, etc. Special Grades quoted at 2s. 2d. to 2s. 4d.

HIGH BOILING ACID.—Is still very scarce and prices of 3s. per gallon upwards are now being quoted.

Coal Tar Products

OWING to the uncertain conditions which still prevail, the coal tar products market remains quiet, and prices are unchanged from last week.

MOTOR BENZOL.—Remains at about 1s. 4½d. to 1s. 5½d. per gallon f.o.r

SOLVENT NAPHTHA.—Quoted at about 1s. 1½d. to 1s. 2d. per gallon f.o.r.

HEAVY NAPHTHA.—Unchanged at about 11d. to 1s. 0½d. per gallon f.o.r

CREOSOTE OIL.—Obtainable at about 3d. to 3½d. per gallon f.o.r. in the North, and at about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Quoted at about 1s. 6d. per gallon f.o.r. for the 98/100% quality, and at about 1s. 4d. per gallon for the Dark quality 95/97%.

NAPHTHALENES.—Unchanged, at about £2 5s. to £2 10s. per ton for the firelighter quality, at about £2 15s. to £3 per ton for the 74/76 quality, and at about £4 per ton for the 76/78 quality.

PITCH.—Remains at 55s. to 57s. 6d. per ton, f.o.b. East Coast part.

Latest Oil Prices

LONDON, October 21.—LINSEED OIL was irregular. Spot, ex mill, £18 5s.; November, £15 10s.; November-December, £15 15s.; January-April, £17; May-August, £18, naked. RAPE OIL was inactive. Crude extracted, £29 10s.; technical refined, £31 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £22; refined common edible, £26; deodorised, £28, naked, ex mill. TURPENTINE was steady. American, spot, 52s. 6d. per cwt.

HULL.—LINSEED OIL.—Spot and October closed at £16 2s. 6d.; November-December, at £16 7s. 6d.; January-April at £17 2s. 6d.; May-August at £18 2s. 6d., naked. COTTON OIL.—Egyptian, crude, spot, £22 10s.; edible refined, spot, and technical, spot, £25; deodorised, £27; naked. PALM KERNEL OIL, crude, f.m.q., spot, £22 10s., naked. GROUNDNUT OIL, crushed/extracted, spot, quoted £29 10s.; deodorised, £33 10s. RAPE OIL, crushed/extracted, spot, £28 10s.; refined £30 10s. SOYA OIL, crushed/extracted, spot, £20 10s.; deodorised, £24 per ton. COD OIL, 17s. per cwt. TURPENTINE not quoted. CASTOR OIL.—Pharmacy, spot, 48s.; first, 43s.; seconds, 41s. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—During the week the market has remained steady and the price continues unchanged at £5 15s. per ton, f.o.b., in single bags. *Home.*—British producers have announced the following further prices: £6 5s. October delivery, £6 10s. November delivery, £6 15s. December delivery, £7 January to June delivery; delivered in six ton lots to consumers' nearest stations.

NITRATE OF SODA.—Prices have not yet been announced in the British markets, but in the United States the price in operation shows a reduction of about 12 per cent. on last year's scales.

Scottish Coal Tar Products

TRADING has been restricted principally on account of shortage of supplies for prompt delivery. Enquiries are plentiful and prices of most products are steady. Pitch is very scarce in this area.

Cresylic Acid.—Some fair sized orders have been placed, but quotations are unchanged. Pale 99/100 per cent., 1s. 5s. to 1s. 6d. per gallon; pale, 97/99 per cent., 1s. 3d. to 1s. 4d. per gallon; dark, 97/99 per cent., 1s. 2d. to 1s. 3d. per gallon; all f.o.r. High boiling, 2s. 9d. to 3s. 3d. per gallon ex works.

Carbolic Sixties.—Value is firm at 1s. 5d. to 1s. 6d. per gallon according to quality, but supplies are short.

Creosote Oil.—A moderate business is being conducted at current price level. Specification Oils, 2¾d. to 3d. per gallon; washed oil, 3⅛d. to 3¼d. per gallon; gas works ordinary, 3¼d. to 3⅜d. per gallon; all f.o.r. in bulk quantities.

Coal Tar Pitch.—With makers disinclined to offer, value is more or less nominal at about 47s. 6d. to 50s. per ton f.o.b. Glasgow for export, and about 45s. per ton ex works for home trade.

Blast Furnace Pitch.—Controlled prices have been further increased to 35s. per ton f.o.r. works; and 40s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—Makers are still unable to offer for prompt and price for forward is 3⅛d. to 3⅜d. per gallon ex works naked.

Blast Furnace Tar.—Production has been discontinued and value is purely nominal at 2¾d. per gallon.

Water White Products.—Very little interest is being taken in this department, although, if anything, there is more inquiry. Motor Benzole, 1s. 3½d. to 1s. 4½d. per gallon; 90/160 Solvent, 1s. 2½d. to 1s. 3½d. per gallon; and 90/190 Heavy Solvent, 1s. 0½d. to 1s. 1½d. per gallon; all f.o.r. in buyers' rail tanks.

South Wales By-Products

SOUTH Wales by-product activities continue to be moderate and featureless. The long expected better call for patent fuel appears at last to be materialising, and in this connection it is significant that Swansea exports alone were last week increased by 9,000 tons. The pitch outlook is consequently a little brighter, but there is no quotation changes to date. Road tar has only a moderate demand, with values steady around the 13s. 6d. per 40-gallon barrel delivered. Refined tars have a fair call, with prices for coke-oven and gasworks tar unchanged. Naphthas are in poor request, solvent having only a small, sporadic call, while heavy has practically no demand. There is no change in values. Patent fuel prices, for export, are: 19s. to 19s. 6d., ex-ship Cardiff; 18s. to 18s. 6d. ex-ship Swansea. Coke prices are: Best foundry, 32s. 6d. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 15s. 6d. to 16s.

New Fireproof Material from Peat

A SWEDISH chemist, B. Liehr, has found that a fireproof material can be produced from peat by treating it with dilute phosphoric acid. According to the patent description, raw peat is first treated to remove a minor part of its water content, in order to facilitate recovering the chemical solution after the reaction, which is carried out by heating under pressure and is completed in a few minutes. The chemical reaction consists in an absorption of the phosphoric acid radical by the cellulose and related substances contained in the peat. The mass is afterwards separated from the mother liquor and dried. The resulting product repels water, a property which is valuable when using the material for building and insulating purposes. The water-repelling power of the material can be further increased by impregnating it with suitable substances. The peat can be mixed with other fibrous materials before being treated in the way described.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Chas. Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, October 20, 1931.

PRICES generally in the Scottish heavy chemical market are higher. Export enquiries are numerous.

Industrial Chemicals

ACETONE.—B.G.S.—£60 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £25 per ton; crystals, £26 per ton; B.P. crystals, £34 per ton; B.P. powder, £35 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at £42 to £43 per ton, ex store.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality. £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 10s. per ton, c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station.

ANTIMONY OXIDE.—Spot material obtainable at round about £34 per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £23 10s. per ton, ex wharf. Spot material still on offer at £24 per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £10 10s. to £11 10s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r works, or £4 12s. 6d. per ton, fo.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £29 per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station.

LEAD, RED.—Price now £30 per ton, delivered buyer's works.

LEAD, WHITE.—Quoted £38 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £42 to £44 per ton c.i.f. U.K. ports. Brown on offer at about £1 jer ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 10s. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p., quoted 2s. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £23 10s. per ton ex store.

POTASSIUM CHLORATE, 99½/100% POWDER.—Quoted £26 15s. per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb. ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77%, £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-toun lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Price not yet fixed.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyer's works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £8 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

A New Synthetic Resin of U.S. Origin

ACCORDING to a research report published by the Mellon Institute of Industrial Research, Pittsburgh, a novel heat-reactive moulding compound is now being produced commercially in the plant of Toledo Synthetic Products, Inc., of Toledo, Ohio. This urea-base compound, called "Plaskon," was evolved at the Mellon Institute under a series of Industrial Fellowships sustained by the Toledo Scale Co. As a moulding compound it is said to be easily manipulated, and this property, in conjunction with the high speed of cure, makes possible rapid low-cost mass fabrication by the moulder. The fabricated product is unexcelled in colour possibilities, combining bright colours with a hard, lustrous surface. Its base shade is one of neutral translucency, permitting pigmenting to give colours of any intensity, either opaque or translucent; infinite varieties in mottled or striated effects are also possible. Its mechanical. electrical and chemical properties are: Specific gravity 1.43; modulus of rupture 10,000 to 14,000 lbs. per sq. in.; tensile strength 4,000 to 6,000 lbs. per sq. in.; impact strength (Sharpe) 0.7 to 1.2 ft. lbs.; hardness (Mohr scale) 3.0 to 3.5; dielectric constant (25°C.) 5 to 6; dielectric strength (puncture) 300 to 400 volts per mil.; water absorption (⅛ in. at 25° C.) 0.07 to 0.66 per cent. in 24 hrs.; unaffected by alcohol, acetone, oil or other common solvents; moderately resistant to cold dilute acids, but quite resistant to cold dilute alkalies and hot very dilute alkalies, such as soap, borax, cleaners, etc.

Five-Day Week in Industry

THERE is no mistaking the fact that there is a growing sentiment in favour of the five-day week in industry. Those of us who already enjoy the privilege—and Benn Brothers, Ltd., the proprietors of this Journal, were pioneers of the five-day week movement—have from time to time welcomed signs that more firms were coming into line and enabling their employees to gain all the advantages in the way of health and relaxation that the long weekend provides. A gradual spread of the movement is noted in the United States of America also, and one of the results of difficult industrial conditions there is expected to be seen in a marked increase in the adoption of the five-day week. According to a report of the United States Bureau of Labor Statistics, just issued from Washington, a considerable number of firms with plants which are now working five days or less are likely, when the depression has passed, to re-adjust their working schedule on a five-day basis. Already 2.4 per cent. of the 27,000 odd establishments have permanently adopted the five-day week and 5.6 per cent. of all the employees covered in the survey are regularly enjoying its advantages. Six Chemical firms are included in the list.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, October 22, 1931.

In one or two sections of the chemical market prices have tended downward a little, but these have been mainly in the nature of adjustments after the recent rapid advances. For the most part, quotations continue steady, with firmness a marked characteristic of a number of products. After the buying spurt which was in more or less full blast up to a fortnight ago, buying interest in chemicals, more especially in the imported materials, has subsided and new transactions during the past week have been on a moderate scale.

Heavy Chemicals

Phosphate of soda keeps steady at from about £12 10s. to £13 per ton from the dibasic quality, with sales this week on rather quiet lines. Caustic soda meets with a fair amount of inquiry, largely against old contracts, the basis of which continues at from £12 15s. to £14 per ton, according to grade. Alkali is firm at round £6 per ton and there is a fairly steady movement of this material also. No big weight of business is going through in the case of hyposulphite of soda, values of which are maintained at about £9 per ton for the commercial quality and £15 for the photographic. Bicarbonate of soda meets with a quietly steady call and quotations are well held at about £10 10s. per ton. With regard to chlorate of soda, inquiry this week has been rather slow but at round £30 per ton prices are much as they were. Sulphide of sodium is rather firm in tendency, offers of the commercial product being in the neighbourhood of £8 per ton and the 60-65 per cent. concentrated solid material at about £10 10s. per ton. Saltcake meets with a moderate demand at from £2 15s. to £3 per ton. Bichromate of soda keeps steady on the basis of 3½d. per lb., a quiet trade being put through in this section. Prussiate of soda, which is offering at from 4¾d. to 5¼d. per lb., according to quantity, is not quotably changed, and a moderate inquiry is reported.

On the whole, the recently-acquired additional firmness in the potash section has been well maintained. Caustic potash is generally quoted at about £40 per ton and at the moment there is little sign of lower prices being entertained. Carbonate of potash is in moderate request, current sales being on the basis of £28 to £28 10s. per ton. Yellow prussiate of potash is firm at round 8½d. per lb., a quiet demand for the material being experienced this week. ' Chlorate of potash has not attracted very much attention but at about £33 per ton values keep up well. Bichromate of potash is in fair demand and prices are maintained at the higher level of 5½d. per lb. Permanganate of potash is only in relatively quiet request, with offers of the B.P. grade at round 6½d. per lb., and of the commercial at 6¼d.

Sulphate of copper meets with a moderate inquiry, quotations this week ranging from about £18 10s. to £19 per ton, f.o.b. White powdered Cornish arsenic keeps very firm on the shortage of offers, prices being nominally £25 to £26 per ton, at the mines, with foreign qualities obtainable at about 50. cheaper. The lead compounds are in moderate demand, and prices are steadier at about £33 10s. per ton for the brown acetate and £34 10s. for the white, nitrate being on offer at £28 10s. to £29. The acetates of lime are on the quiet side, with grey selling at from £12 per ton and brown at about £7 5s.

Acids and Tar Products

Acetic acid meets with a moderate inquiry and values are well held at the recent advance to £51 per ton for the technical glacial quality, and £38 5s. per ton for the 80 per cent. commercial grade. Citric acid is steady at about 1s. 1½d. per lb., tartaric being on offer at from 1s. 0½d. to 1s. 0¾d. per lb.; in both cases the demand is quiet. Oxalic acid is firm and in moderate request at 42s. per ton, ex store.

Among the by-products pitch continues to attract a fair amount of attention and quotations are very firm at from 62s. 6d. to 67s. 6d. per ton., f.o.b. The demand for creosote oil shows little improvement but prices still range from 3¼d. to 4¼d. per gallon, naked, at works, according to quality. Crystal carbolic acid is in moderate request at about 5¾d. per lb., f.o.b., with crude 60's at round 1s. 6d. per gallon, naked. Solvent naphtha is firm in tendency at 1s. 3½d. per gallon, naked.

Company News

Burt, Boulton and Haywood.—A final dividend of 4 per cent. is announced on the ordinary shares, payable on October 31, making a total of 8 per cent. for the year ended June 30, against 9 per cent. for the previous year.

Burmah Oil Co.—An interim dividend of 5 per cent., less tax, is announced on the ordinary shares. This compares with a half-yearly distribution of 10 per cent. for several years past. For the whole of 1930 the company paid 22½ per cent., against 30 per cent. for 1929.

Lawes' Chemical Manure Co.—The report for the year ended June 30, 1931, states that the reduction and return of capital and revised memorandum of association were approved by the Court on March 30, 1931, and the present accounts give effect to writings down sanctioned by the Court. A return of 2s. per share has been made. The profit and loss account shows a balance of £1,515 (against the loss of £4,205). In view of the continued uncertain position of foreign trade generally the directors recommend that £595 be transferred to reserve against loss on exchange, making this reserve £2,000, and the balance of £919 be carried forward.

American Smelting and Refining Co.—The consolidated income account for the six months to June 30 last show a profit, after taxation, but before meeting bond interest and depreciation of $4,923,519 (£984,704 nominal), compared with $10,671,129 (£2,134,226) in the corresponding period of 1930. After deducting bond interest, depreciation, obsolescence, ore depletion, dividends amounting to $1,750,000 on first preferred stock and $600,000 on second preferred stock, the company earned on the common stock $402,404, or 22 cents per share for six months, compared with $2.74. The net result, after meeting preferred and common dividends, is that the surplus of $37,540,618 brought in is reduced to $3,829,736. The company has written down to cost or market value, whichever lower, its metal carry in excess of normal. This involved a charge against profits of $1,487,230, after giving effect to which the company failed to earn its preferred dividends by an amount of $1,084,826. The total current and miscellaneous assets amount to $76,991,219 (£15,398,243), more than 5,456 times the total current and miscellaneous liabilities of $14,109,096. During the period the company charged off $2,325,245 for depreciation and obsolescence, and $432,885 for depletion, a total of $2,758,130. At the end of the period, the cash and U.S. Government securities in hand totalled $20,726,664 (£4,145,332).

Canadian Chemical Industries

Reduced Output of Acids, Alkalis and Salts

The Dominion Bureau of Statistics at Ottawa reports that production from the acids, alkalis and salts industry in Canada last year was valued at $20,111,602, as compared with $28,021,972 in 1929, and $21,256,286 in 1928. Seventeen plants were in operation including 10 in Ontario, 3 in Quebec, 3 in British Columbia, and 1 in Nova Scotia. Capital employed by these concerns was reported at $52,314,567; employees numbered 3,409; payments for salaries and wages totalled $3,502,834, and materials used in manufacturing cost $4,712,471.

Production of 66° Bé sulphuric acid in Canada totalled 107,352 tons, of which 93,913 tons at $1,138,441 were made for sale and the remainder for further use in the makers' chemical plants. Eight different plants produced sulphuric acid in 1930.

Hydrochloric acid was made in 3 plants, all operated by the same company. Nitric acid, acetic acid, nitre cake and calcium carbide were each made in 2 factories during 1930, while each of the following chemicals was made in only one plant: calcium cyanamide, sodium carbonate, sodium cyanide, sodium hydroxide, phosphorus, phosphoric acid, ammonium phosphate, sodium hypochlorite, liquid chlorine, acetylene black, hydrofluosilicic acid, butyl acetate, ethyl acetate, paraldehyde, pentasol acetate, vinyl acetate, croton aldehyde, and synthetic anhydrous ammonia.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgment

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

MACDONALD, R. F. AND CO, 2 Bank Street, Manchester, chemical manufacturers. (C.C., 24/10/31.) £22 13s. 1d. September 17.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

DRUG AND CHEMICAL CORPORATION, LTD., London, W. (M., 24/10/31.) Registered October 9, Land Registry charge securing £5,500 and a further advance of £2,500, to Mrs. R. M. Benjamin, 57 Exeter Road, Brondesbury; charged at 41 and 41b Lower Kennington-la, S.E. *£5,000. January 13, 1931.

RAYON MANUFACTURING CO. (1927), LTD., Leatherhead. (M., 24/10/31.) Registered October 9, series of £100,000 debentures (inclusive of £45,000 already registered), present issue nil; general charge. *£147,290. May 14, 1931.

London Gazette, &c.

Companies Winding Up

THE BRITISH ACETATE SILK CORPORATION, LTD. (C.W.U., 24/10/31.) Winding-up order, October 13, 1931.

PETROLEUM REFINERIES, LTD. (C.W.U., 24/10/31.) Winding-up order, October 13, 1931.

New Companies Registered

C. AND M. COX, LTD.—Registered October 15. Nominal capital £500 in £1 shares. Drysalters, chemists and druggists, manufacturers of chemicals, drugs, essences, flavours, perfumery, essential oils, synthetics, etc. A subscriber: W. A. Phillips, 18 George Road, West Bridgford, Notts.

CYRIL BARBER, LTD., New Wakefield Mills, Dewsbury, Yorks.—Registered October 19. Nominal capital £100 in £1 shares. Oil extractors by crushing, chemical or any other processes, oil manufacturers and refiners, soap boilers and makers, shoddy and artificial manure manufacturers, dealers in waste. Directors: C. Barber and Mabel Barber.

New Chemical Trade Marks

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to October 30, 1931.

GROVO.

523,307. Class 1.—Chemical substances used in manufactures, photography and philosophical research and anti-corrosives, but not including glue and not including any goods of a like kind to glue. Henry Sefton Greaves, trading as H. T. Greaves and Co., Crown Works, Lime Street, Kingston-upon-Hull; paint, enamel, varnish and fine colour manufacturers.—June 4, 1931.

SOLABIL.

525,449. Class 1.—Chemical substances used in manufactures, photography and philosophical research and anti-corrosives, but not including fire resisting cements and not including any goods of a like kind to fire resisting cements. Superfine Chemicals, Ltd., 22 Buckingham Gate, Westminster, London, S.W.1; manufacturers.—September 3, 1931.

EELIDE.

525,514. Class 2.—Chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. William Paterson and Sons (Aberdeen), Ltd., 57-59 Spring Garden, Aberdeen; wholesale druggists and manufacturing chemists.—September 5, 1931.

OPTOGEL.

525,720. Class 2.—Chemical substances used for purifying and sterilising water and other liquids. Naamlooze Vennootschap Standard Water, Maats-Chappij (a joint stock company organised under the laws of Holland), 216 Amstel, Amsterdam, Holland; manufacturers.—September 15, 1931. (Date claimed under the International Convention, July 24, 1931.)

DIGIGLUSOL.

525,779. Class 3.—Chemical substances prepared for use in medicine and pharmacy. May and Baker, Ltd., Garden Wharf, Church Road, Battersea, London, S.W.11; manufacturing chemists.—September 17, 1931.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country) except where otherwise stated.

POLAND.—A general merchant established in Warsaw desires to get into touch with British manufacturers of blackplates, tinplates and non-ferrous metals with a view to obtaining agencies for Poland and the purchase of goods on his own account. (Ref. No. 385.)

EGYPT.—The Department of Public Health is calling for tenders, to be presented in Cairo by December 26, for the supply of 2,000 kilos. carbon tetrachloride. (Ref. F.X. 1300.)

EGYPT.—The Department of Public Health is calling for tenders, to be presented in Cairo by December 26, for the supply of 35 metric tons of stabilised chloride of lime. (Ref. F.X. 1301.)

EGYPT.—The Department of Public Health is calling for tenders, to be presented in Cairo by December 26, for the supply of (1) 50 metric tons of disinfectant fluid for general purposes; (2) 12,000 kilos. of disinfectant for medical purposes. (Ref. F.X. 1302.)

Tariff Changes

AUSTRALIA.—The following amendments of the Australian Tariff are announced, operating on and from October 8:—

	New Duties (a)	New Duties (b)	Former Duties. (a)	Former Duties. (b)
Soda ash for manufacturing purposes, as prescribed by departmental by-laws	Free	Free	Free	Free
Sulphate of magnesia in packages not exceeding 7 lb. per lb.	1d.	1¼d.	20%	30%
Bismuth salts per lb.	3s.	4s. 6d.	8s.	10s.
Bismuth metal per lb.	2s. 3d.	3s. 6d.	8s.	10s.
Acetyl-salicylic acid (in powder form), *ad valorem*	25%	40%	Unchanged.	

(a) British Preferential Tariff. (b) General Tariff.

CHILE.—Resulting from the recent exchange of notes between H.M. Ambassador at Santiago and the Chilean Government, the reduced duties which have been applied to French and other products are now applicable to similar goods originating from Great Britain and Northern Ireland.